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STEEL

The Magazine of Metalworking and Metalproducing

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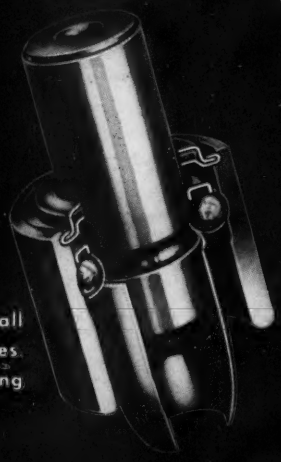

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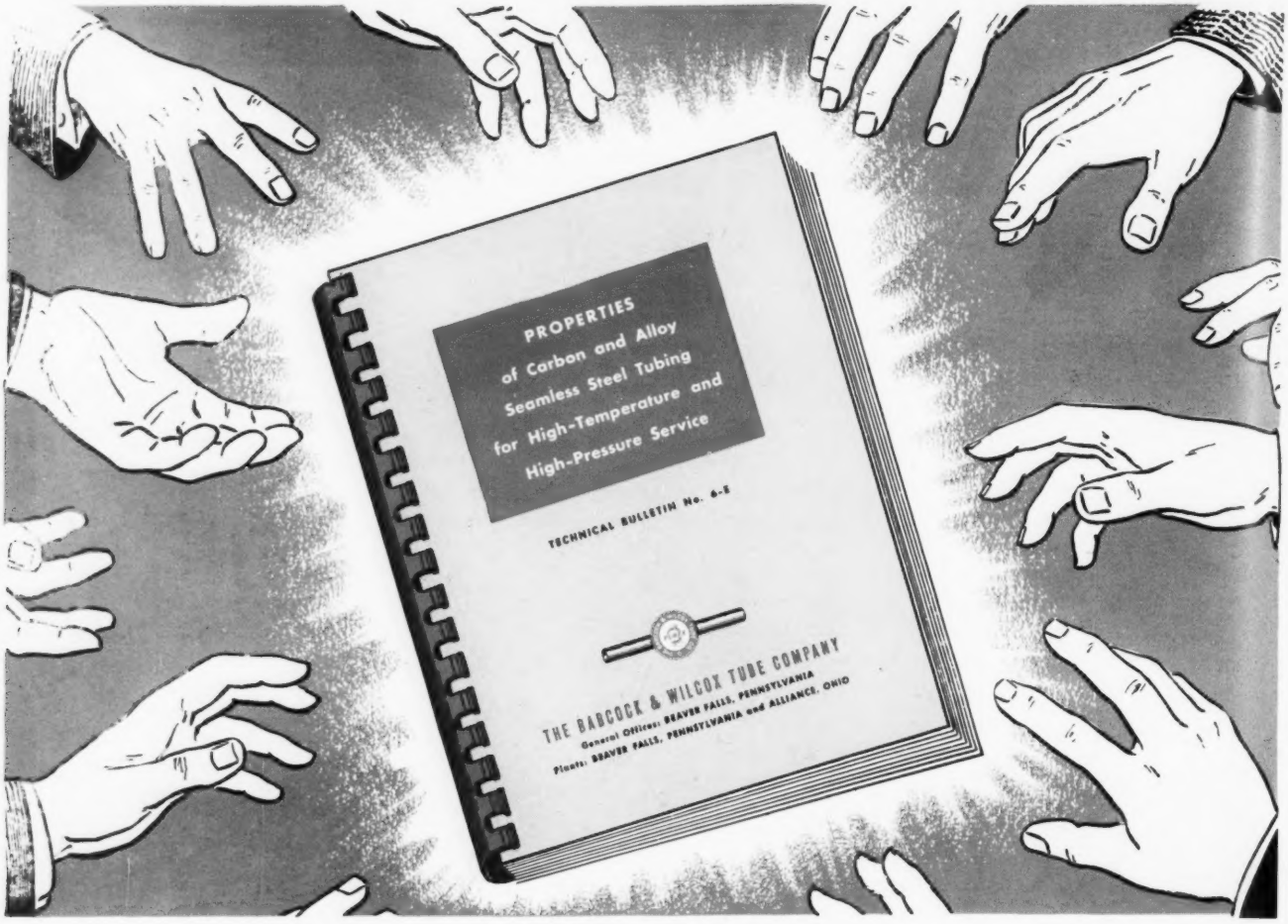

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X-Ray Measuring Strains in Metal

Roll Neck Seals—Their Development, Application

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STEEL

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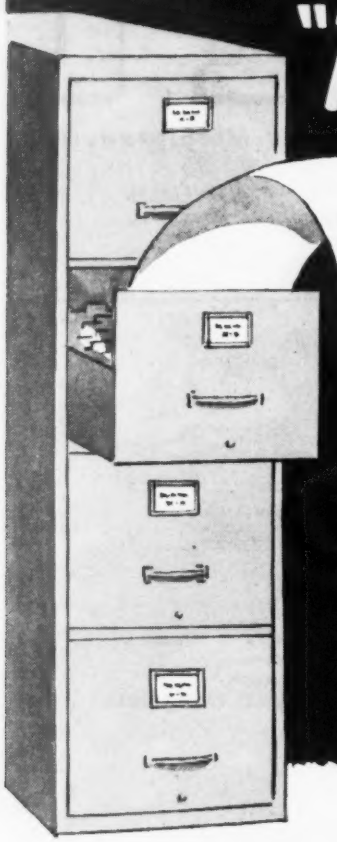

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November 22, 1948

Who Is To Lead?

At the annual meeting of the Youngstown Chamber of Commerce last Tuesday, Tom M. Girdler, chairman of Republic Steel Corp., made two statements which are of timely importance to American industry.

In reply to his own question as to who is to lead the way back to world freedom and democracy, he said, "I think we shall find leadership among the businessmen and women of the world." He explained that he meant not those "glibly called big businessmen" but the "10 million in this country—big and little—who run grocery stores, butcher shops and factories and employ 61 million people."

He also remarked that "too many of us—and businessmen are not immune—are too ready to run to the government with our troubles and to ask the government to bail us out."

Almost everybody will agree that better leadership on the part of businessmen is desirable and that running to Uncle Sam for help should be avoided. However, before these laudable objectives can be achieved there must be a greater degree of cohesion among businessmen than exists at present.

It is an unfortunate fact that during and since the war there has developed a rift between the large and powerful corporations on one side and the smaller units of industry on the other. This has grown to the point where many operators of smaller independent establishments have lost confidence in the good intentions of their larger industrial brothers. Many executives of these companies feel they have been treated unfairly and are bitter about it. Many of them have gone to Washington with their troubles reluctantly—after having exhausted all other means of solving their difficulties.

Most informed people know that there are two sides to this unfortunate feud between the strong and the weak. They know the extraordinary lengths to which many powerful companies have gone in an effort to be fair to everybody. Nevertheless there has been unfairness, however unintentional it may have been.

If industry's leaders somehow can find a way to end this unnatural feuding, real or fancied victims will be less inclined to run to Washington, and all industry—reunited—will be in a better position to develop the leadership that Mr. Girdler envisions.

* * *

ORDERLY ADJUSTMENT: Evidence is mounting daily to indicate that pipelines extending from producers and manufacturers through distributors to the ultimate consumers are filling up. In the case of some lighter consumer products of the metal working industries, the filled-up pipelines have created a condition wherein a moderate decline in retail sales almost immediately is reflected in reduced production schedules at the factory, resulting in temporary layoffs or cutbacks in number of shifts or in hours worked per week.

This is true of some electrical appliances, such as radios, vacuum cleaners, ironers, flat irons, water heaters and miscellaneous small appliances. It also is true of typewriters and some types of office machinery.

A somewhat similar situation is found among producers who sell to manufacturers rather than to the public. Some foundries, metal stamping plants, forge shops and similar establishments have experienced moderate to sharp reductions in their backlogs of orders.

It would be unwise to generalize or to assume from these scattered instances that industry is on the verge of a recession. In many lines the

(OVER)

backlogs are not receding. Also, it should be noted that in some consumer lines where the pipelines have been filled, current buying does not reflect the real needs of the public because of price resistance.

This spotty condition, while momentarily painful for some manufacturers, is healthy for the nation's economy as a whole. Much better that segments of industry make their necessary adjustments at staggered periods than that they all be forced to do it at the same time. —p. 39

* * *

BUSINESS AND POLITICS: At the annual meeting of the National Tool & Die Manufacturers Association in Milwaukee, Congressman Walter C. Ploeser, chairman of the House Small Business Committee, urged that the State Department be strengthened as an agency for developing foreign trade. On trips abroad he found that American attaches seldom have a sense of responsibility to business men and often take a supercilious attitude toward them. In contrast, their opposite numbers from England are promoting British trade at every opportunity.

American industrialists and American attaches in foreign countries have much to learn about doing business in nations where volatile political conditions prevail. In the past British trade supremacy was built upon the ability of the British to deal with any one of several political regimes in any country with equal effectiveness. Conditions in Germany, France, England and China now challenge us to become proficient in these tactics. —pp. 44, 49

* * *

RETHRONING KING COAL: One of this nation's blessings is a practically inexhaustible supply of high grade bituminous coal. Significantly, two projects which were in the news last week point to a greater utilization of this asset.

At Library, Pa., Pittsburgh Consolidation Coal Co. and Standard Oil Co. of New Jersey opened a $500,000 pilot plant, the objective of which is to find methods of lowering the cost of converting coal into gas, gasoline, diesel fuel, tar products and chemicals. At Louisiana, Mo., the Bureau of Mines soon will open "coal-to-oil" demonstration plants based upon techniques developed by I. G. Farbenindustrie at Hochst, Germany.

These experimental plants conceivably could alter our national economic outlook in a vitally important way. They could shift a great burden from our questionable supply of petroleum to our abundant resources of soft coal.

—pp. 45, 46

* * *

METAL POWDER PARTS: Metal Powder Association estimates that nearly 30 million pounds of products will be manufactured by powder metallurgy processes in the current year. This is striking evidence that powder metallurgy techniques are gaining favor in the mass production field.

Products of this young branch of industry range in weight from about 0.001 ounce to 100 pounds and in size from 0.001 square inch to approximately 20 inches in diameter. Copper, iron, lead, tin, aluminum and alloy powders in that order will continue to be used in greatest quantity. Almost all commercially-significant metals, as well as certain ceramics and powdered glass, also will be represented. Prices of the most commonly used metal powders range from 11 cents to $12 per pound.

The automobile and aircraft industries are believed to furnish the largest potential markets for powdered metal products, which currently consist chiefly of gears, cams, bearings, friction materials, sleeves, bushings, rings and filters.

—p. 73

* * *

WHO NEEDS WHAT? In a letter to the editor, Walter Siegerist, president of Medart Co., reports on thought-provoking conditions he observed on a business trip through France, Switzerland, England, Germany, Belgium and Holland.

In a Belgian bolt and spike plant he saw more steel in the bar storage building than he had seen in one place in the United States since before the war. In the scrap pile of a Swiss brass mill he saw U. S. brass artillery shell cases bought in the Philippines. He was amazed at the amount of ferrous scrap in Germany. He wondered why the French must have rolled steel props for their coal mines while we get along with timber or concrete props.

On the basis of Mr. Siegerist's observations, perhaps more scrap, pig iron and steel should be flowing from Europe to the United States, where it is needed badly. In exchange, Europeans could take dollars or machinery, either of which they need more than scrap, pig iron or steel. —p. 106

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

PIPELINES FILLING— An increasing number of the lighter consumer products of the metalworking industries are passing or have passed out of the sellers' market into a buyers' market (p. 39). Reflecting this and reduced sales, several important companies recently laid off employees. However, statistics show consumers are not yet oversupplied—just priced out of the market in many instances. Preparing to face reduced volume of business, supply and machinery manufacturers and distributors at a forum in Chicago discussed ways in which they can lower costs and their break-even point (p. 41).

NEW LIFE FOR SHIPBUILDING—Substantial demand for products of the steel and metalworking industries is seen being generated by revival of interest in the U. S. merchant marine (p. 40). Until about six months ago the merchant marine had been shriveling, but since then contracts have been let for approximately 60 fast tankers and five passenger ships, two new ships that could be mass-produced in event of war have been designed, and a $65 million superliner has been planned.

NEW SCRAP RECORD—Consumption of purchased or open-market iron and steel scrap this year will set a new record at about 29 million tons (p. 40). This would be 15 per cent greater than the all-time record established last year, and one-third larger than the wartime consumption peak. Edwin C. Barringer, executive vice president, Institute of Scrap Iron & Steel Inc., says it is purchased scrap that is making possible record steel mill operating rates.

DEFENSE STEEL ASSURED—Extension to Sept. 1 next of voluntary allocations programs providing steel for the armed forces, the Atomic Energy Commission projects, and the National Advisory Committee for Aeronautics is virtually assured as result of recent public hearings (p. 41).

PIPEMAKER'S DREAM—For use in producing line and oil field pipe, an electric resistance welder, said to be the largest of its type ever built, has been completed (p. 41) by a Cleveland company. Weighing 90 tons and selling for $600,000, the giant will be exported to a South American buyer.

FAVORS PRICING CHANGE—On the basis of recent hearings before his trade policies committee, Sen. Homer E. Capehart would recommend legalization of freight absorption (p. 42) for legitimate and competitive purposes.

RECOMMENDS OVERHAULING— To give increased help to the small business man, Congressman Walter C. Ploeser would revamp the Department of Commerce and Federal Trade Commission (p. 44).

STUDY GASIFICATION—Full-scale research into conversion of coal to synthesis gas for factories and homes and for providing important by-products began last week with opening (p. 45) of a $500,000 pilot plant in Pennsylvania.

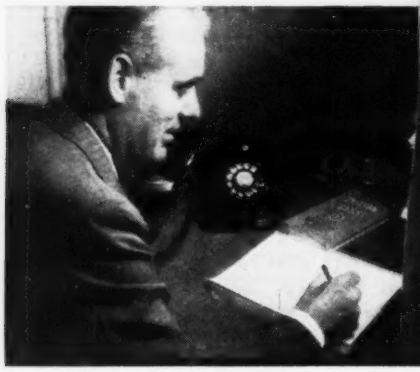
OCCUPATIONAL DEFERMENTS—Metalworking companies can expect the same occupational draft deferments for their employees in event of another war as were granted during World War II (p. 51).

HERE AND THERE IN INDUSTRY— A fourth-round wage increase is expected by the Truman administration (p. 43) . . . Radical ideas of some members of the incoming Congress are arousing concern among businessmen (p. 46) . . . Hearings on proposed $439 million Lake Erie-Ohio River canal have renewed a 31-year-old battle over the proposed 105-mile waterway (p. 45) which would require nine years for construction . . . Retroactive cancellation of portal-to portal pay claims by Congress in 1947 was upheld (p. 45) by the U. S. Supreme Court . . . A tonnage oxygen plant removed from Germany to the United States will go into operation soon (p. 46) at a Bureau of Mines gasification plant . . . Europe within four years can become reasonably prosperous by European standards, believes Paul G. Hoffman, Economic Cooperation Administrator (p. 48) . . . Although shipments to Europe under the Economic Cooperation Administration increased in September, U. S. exports as a whole declined (p. 50), largely because the Army's civilian relief shipments decreased.

Engineering News, p. 67 *Market Summary, p. 125*

Howard Allen, *Inspector*

Howard Allen, *Lab. Man*



Howard Allen on *Order Desk*

Howard Allen, *Sales Representative*

Howard Allen, *Machine Operator*

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Pipelines to Consumers Filling?

Lighter metalworking products entering buyers' market. Sales of many appliances lag behind 1947. Manufacturers' prices continue upward, but weaken at retail level

AN INCREASING number of the lighter consumer products of the metalworking industries are passing or have passed over the invisible line dividing a sellers' market from a buyers' market.

Most household appliances now can be obtained on spot delivery. Price resistance is noted by retailers who, in many cases, are offering discounts or premiums to promote sales. Sears, Roebuck at Cleveland last week was offering a $25 Thanksgiving dinner for eight to purchasers of refrigerators or deep freeze cabinets.

Sales of electrical household appliances during the first seven months of 1948 lagged behind those for the comparable 1947 period on practically all items except washers, refrigerators and ranges. Unit sales of irons were down 36 per cent, radios were off 14 per cent, vacuum cleaners declined about 4 per cent and ironers 4 per cent. Miscellaneous small appliance sales dropped. Domestic water heaters are in surplus supply.

Office Machine Backlog Fades— Typewriters, calculating machines, cash registers and other office machinery in standard models now can be obtained immediately in most cases. The volume of sales continues high, but the backlog of orders has melted away.

Bicycles, tricycles and wheel toys are easily obtainable. In some cases retailers are offering them at discounts from list prices.

Even in farm machinery and equipment, where sustained high farm income maintains a high level of demand, the gray market and premium prices have virtually disappeared.

The fancier automobile models, including station wagons and convertibles, are not too easy to sell and some auto dealers are anticipating the day when they will have to return to selling standard model cars.

Employment Cutbacks — Instances of layoffs of workers, necessitated by lagging sales, are noted. General Electric this week is cutting production by 50 per cent at its White Plains, N. Y., kitchen disposal unit plant. Reason: low sales. At Syracuse, N. Y., the L. C. Smith & Corona Typewriter Co. has reduced the workweek to 4 days for some 2000 employees, as result of declining demand. Indian Motocycle Co., Springfield, Mass., has laid off 250 of its 1050 employees and reduced operations to one shift. U. S. Time Corp. will cut its working force from 3200 to 1000 by Jan. 1, because mounting wage demands are pricing its product out of a market. Worthington Pump & Machinery Corp., Holyoke, Mass., will lay off 20 per cent of its 1000 employees.

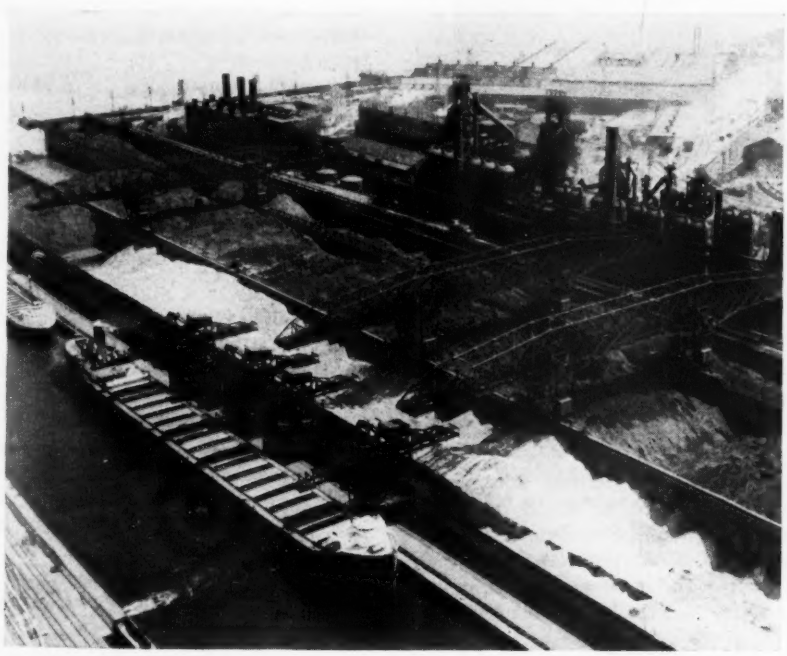
Paradox in Appliances — While many retailers are offering discounts and premiums on household appliances, the trend in manufacturers' prices continues upward. Manufacturers argue that increasing wage and material costs necessitate the higher factory prices. Thus is created the paradox of rising prices at the factory level and softening prices at retail, a situation unlikely to continue long.

Washing machine salesmen are seeking to promote sales by offering a year's supply of soap flakes free with every sale. Deep freeze cabinet sellers offer a supply of meat or other frozen foods.

Sales Continue at High Level— Notwithstanding these symptoms of weakening, sales of appliances and similar goods continue at a high level. Many industry statisticians contend the accumulated deficit of the war years has not yet been made up.

Federal Reserve Bank of Cleveland figures that although washers have been sold at a rate of 340,000 a month for the past two years, the average monthly rate since 1941, including the war period, has been only 130,000 a month. This compares with 160,000 monthly during 1941.

Electric refrigerator distribution is now running at a rate of 340,000 a month. Yet for the past eight years the "consumption" figure comes out around 130,000 a month, as against 275,000 monthly in 1941. Radio and television sales over the past eight years are estimated as averaging 600,000 monthly, against 1 million a



GIANTS: Standing 235 feet tall, with a daily capacity of 1500 tons of iron each, these new twin blast furnaces at the South Chicago Works of Carnegie-Illinois Steel Corp. are among the world's largest. As seen from a helicopter, they form a backdrop to the iron ore and limestone storage yards as well as the ore boat unloading operations at this U. S. Steel Corp. subsidiary plant

month in 1941. Passenger car sales over the past eight years have averaged 125,000 a month, against 300,000 or more per month during most of 1940-41.

These statistics, the bank says, suggest that consumers are not yet oversupplied when allowance is made for the long period of nonproduction as well as for the postwar growth in the number of family units.

Prices rather than need is the restraining factor in sales.

Steel's Record Imposing

POSTWAR production records of industries such as the automotive, home appliance, can and container, farm implement and many others, are a tribute to those industries, but they are a still greater tribute to the steel industry, Bennett S. Chapple Jr., assistant vice president, United States Steel Corp. of Delaware, said in an address before the Controllers Institute of America at the Duquesne Club, Pittsburgh, last week.

Mr. Chapple said that the steel industry had turned out the basic steel to support the unprecedented employment and the largest peacetime production in the history of our nation, "in spite of worn tools; in spite of shortages of manpower, scrap, coal and pig iron . . . and other retardents."

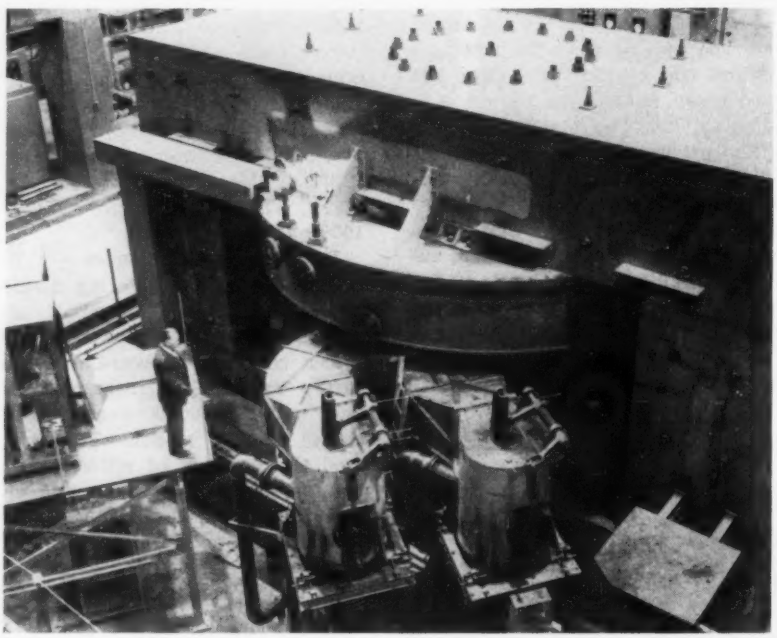
Productive Capacity — Turning to the problem of the steel industry's productive capacity, Mr. Chapple said: "Any discussion of capacity today which fails to examine the problem in the light of the international situation, ignores additionally important factors, and inevitably leads to erroneous conclusions.

"No further proof of the importance of this aspect of our problem is needed than the revelation of the simple fact that in 1937, the United States accounted for 38 per cent of world production of steel, while in 1947 we produced more than 56 per cent. Experienced analysts have placed this percentage up to 59 per cent by discounting Russian claims.

"This increase has resulted largely from curtailed production in foreign countries and only in smaller part from an increase of 15 per cent in our capacity since 1939.

"If devastated nations abroad are to be rebuilt on a sound economic basis, without continuing subsidy from this country's resources, then inevitably the American steel industry must make a major contribution during each of the next several years. We have no option!

"There is another important factor that I should like to mention briefly," he said. "It is one which was unforeseen even as late as January of this year, and one which, when superimposed on the already heavily burdened distribution problem of the steel industry, may, unless prudently handled, further disarrange our economy. This is the steel required for our defense program."



BIG MAGNET AT WORK: Columbia University's 2500-ton cyclotron is shown above as its huge magnet, claimed to be the world's largest to date, is operated for the first time. The cyclotron, located at Irvington-on-the-Hudson, N. Y., is expected to be completed early next year. NEA photo

Shipbuilding Reviving

Sixty-nine vessels, totaling over 1 million tons, under construction or contracted for here

REVIVAL of interest in the United States merchant marine with resultant planning of numerous new ships is seen creating a substantial demand for products of the steel and metalworking industries.

Until about six months ago the merchant marine had been shriveling, but since then contracts have been let for approximately 60 fast tankers and five passenger ships; designing of two new "prototype" ships that could be mass-produced has been announced, and a $65 million superliner has been planned.

A permanent ship facilities committee has been created under the National Security Resources Board to integrate the country's naval and merchant shipbuilding program on a long-range basis. Up to Oct. 1, 69 new vessels totaling more than a million gross tons were either under construction or contracted for in this country.

Planning Groups—If the new committee can successfully follow the aims set up for it, the steel and metalworking industries would be assured of a long-term demand from shipbuilders, for as W. John Kenney, undersecretary of the Navy, said, "This will give our ship designers and shipbuilders something to look forward to in the way of continuous attention and definite suport."

Record Scrap Year Seen

CONSUMPTION of purchased or open-market iron and steel scrap in 1948 will set a new high record at about 29 million gross tons, Edwin C. Barringer, executive vice president, Institute of Scrap Iron & Steel Inc., Washington, predicts.

This would be 15 per cent greater than the all-time record of 26 million tons, established in 1947. It would be one-third larger than the wartime peak of consumption.

More Purchased Scrap—"Based on Bureau of Mines statistics, the melt of home or intra-plant scrap this year will barely exceed the 28 million gross tons of last year, while pig iron will do well to equal the 52 million tons of 1947," said Mr. Barringer. "It is purchased scrap that is making possible record steel mill operating rates."

Of the 29 million gross tons of pur-

chased scrap that will be melted this year to make new steel and castings, about 7 million tons will be the waste of manufacturing operations and 4 million tons will be provided by the railroads. The remaining 18 million tons will come from auto wrecking yards, farms, wrecking operations, collectors, demolition, shipbreaking, and other sources. Imports, principally from Germany, will account for about 300,000 tons.

In addition to melting record-breaking tonnages of scrap, steel mills and foundries have put about 1 million tons into inventory this year.

Seek Way To Lower Costs

Industrial distribution forum stresses need to consider problem before volume slumps

WAYS in which producers and distributors can lower costs and bring the breakeven point down to where a substantially lower volume of business will still result in a satisfactory profit margin dominated an industrial distribution forum in Chicago Nov. 16 sponsored by the American Supply & Machinery Manufacturers' Association Inc. and the National Supply & Machinery Distributors' Association.

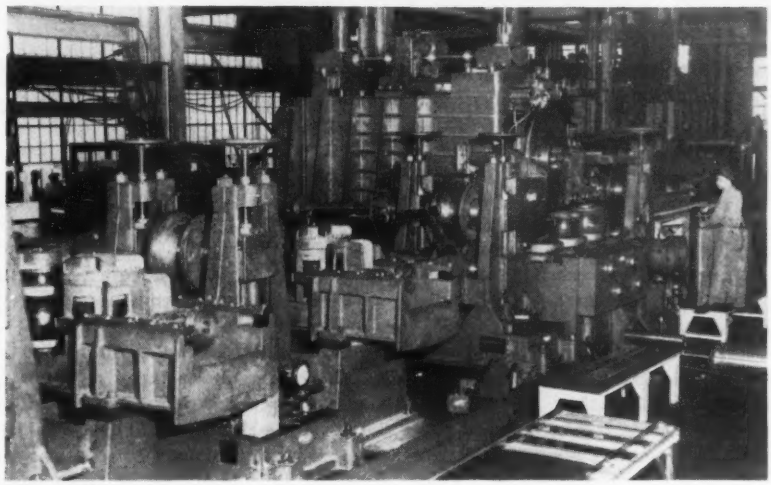
Entitled "After the Breakeven Point, What?" the forum, consisting of two major addresses and an afternoon-long panel discussion, stressed the immediate need for consideration of the problem, not after general business volume declines and hasty and ill-considered cost-cutting steps are mandatory.

Storm Warnings—Edwin L. Morris, partner in the management engineering firm of Booz, Allen & Hamilton, Chicago, said storm warnings are starting to be raised, that signs of a recession already exist.

Whether it comes soon or not for years and whether it is mild and of short duration or severe and long makes little difference in the planning and thinking which should now be going on in order that individual companies can prepare for it and weather it safely. Preparing now automatically strengthens a company's competitive position and renders it better able to function in today's boom times, he declared.

Need Corrective Action—Russell C. Duncan, president, R. C. Duncan Co., Minneapolis, and past president of NSMDA, addressed most of his suggestions on paring costs in anticipation of lower sales volume to the distributors present, mentioning, however, that producers must also take corrective actions if the manufacturer-distributor team is to function properly. Among these, he suggested that producers check to see that if f.o.b. mill pricing is being used the distantly located distributors are getting a fair break on proposed resale prices; that factory representatives should now be stepping up their distributor training efforts.

Chairman of the program was Ralph M. Johnson, vice president and general sales manager, Norton Co., Worcester, Mass., and moderator of the panel discussion was Harold E. Torell, vice president, Syracuse Supply Co. J. G. Geddes, president, ASMMA, and E. H. McLaughlin, president, NSMDA, spoke briefly on the purposes of the forum.



BIG WELDER: Claimed by its builder, the Yoder Co., Cleveland, to be the largest electric resistance pipe welder of its type ever built, this rotating transformer, single phase, alternating current unit is to be shipped to Di Tella Corp., Buenos Aires, Argentina. The complete welder weighs more than 90 tons, and with seven forming and three sizing and straightening stands sells for around $600,000. Pipe capacity ranges from 0.187 in. wall thickness by 4½ in. o.d. to 0.500 in. wall by 16 in. o.d.; speeds range from 15 to 60 feet per minute. The welder transformer weighs around three tons, while the copper alloy electrodes, which are 54 in. in diameter and nearly 4 in. thick weigh one ton per pair. Two more of these welders will be built, one for Henry J. Kaiser Co. in California and one for Page-Hersey Tubes Ltd., Toronto, Canada

Defense Steel Assured

EXTENSION of the three voluntary allocations programs providing steel for national defense is virtually assured as result of public hearings Nov. 15 at which no objections were expressed.

These programs call for 102,505 tons monthly for the armed forces, 16,244 tons monthly for Atomic Energy Commission projects, and 1926 tons monthly for requirements of the National Advisory Committee for Aeronautics. The extension calls for continued deliveries in these quantities up to Sept. 1.

In the meantime, Commerce officials believe, Congress will provide the President with adequate authority to continue obtaining steel for purposes the government identifies as essential—whether by voluntary or mandatory allocations.

Way Cleared—The way for extension of the other seven programs which were set up under voluntary allocations agreements was partially cleared recently by a letter from Attorney General Clark authorizing Secretary Charles Sawyer to use the same "procedure" under which extension of the three defense programs was arranged.

Whether the programs will be extended depends on whether the Steel Producers Advisory Committee consents to such an extension.

These remaining programs cover requirements for freight car construction and maintenance; warm air heating equipment for residential housing; pig iron for certain products for residential housing; steel for barges and towing vessels; steel for tank and oil field production equipment; steel for the anthracite industry; and steel for oil tankers.

Committee Named—A 17-member oil terminal and bulk tank storage industry advisory committee has been appointed to advise and consult with the OIC.

Pricing Dislocation Pictured

Witnesses tell Capehart committee how change to f.o.b. mill pricing has handicapped steel buyers. Many consumers now paying higher delivered prices for material

SEN. Homer E. Capehart (Rep., Ind.), chairman of the Senate Trade Policies Committee, declared last week that Congress should pass a law to permit business to absorb freight as it sees fit so long as there is no collusion or conspiracy involved.

He said his committee "has definitely established" that the basing point ban benefits big business to the detriment of small business and that the Supreme Court decision will have a tendency to centralize industry instead of decentralizing it.

These opinions were expressed following committee hearings on the effects of the Supreme Court decision and Federal Trade Commission rulings on pricing practice in the cement and other industries.

If expressions by witnesses before the Capehart Committee represent the thinking of a representative cross section of industry, the impact of the Cement decision on the American economy is going to be much more profound than has been generally realized.

Witness after witness has testified that abandonment by just one industry, steel, of its traditional multiple basing point delivered price system, and the adoption of f.o.b. mill prices, is having these consequences: Many consumers have been dropped by their old sources of steel supply and are having a hard time in obtaining even reduced supplies; many now can get steel only from one mill as compared with the old setup under which, when mills equalized each others' delivered prices, they could get it from various mills; many consumers, because of the new f.o.b. mill prices, have to pay substantially more for their steel due to the higher freight rates; and many consumers are losing out in competition with competitors who are more favorably situated under the f.o.b. mill price system.

Issue for Other Industries — The same things that have happened in the steel picture are reflected in cement. Further, all other basic industries in America are faced with this price issue and can expect sooner or later to become affected. Unless Congress modifies the law, sweeping business-relocation and population shifts are in the wind. On the one hand, there will be ghost towns and cities. On the other, there will be great and increasing concentration of industry at such centers as Pittsburgh with its current excess steelmaking capacity.

Attending the hearings were congressmen not connected with the Capehart committee but who came to Washington especially because of fears that, unless the Cement decision is cancelled out by remedial legislation, their states or districts are going to lose industries. One of these, Rep. Noah M. Mason (Rep., Ill.), took the stand in an appeal for action to prevent his native Oglesby, Ill., from becoming a ghost town. Oglesby, he said, has 4000 people who depend for their livelihood on two cement mills; if the Cement decision stands, he said, Oglesby will have to fold up, because cement mills at other locations have a lower freight rate to Chicago and other large consuming centers.

"If the decision stands," he said, "our people will lose their jobs; they will lose their homes because nobody will want to buy them. Further, they will have to move to some place where there are no homes for them."

FTC Not Encouraging—Walter B. Wooden, associate counsel for the Federal Trade Commission who steered the Cement case and numerous other commission actions, told the committee that, as the law and its interpretation now stand, a businessman can be certain that he is not violating the law only by quoting f.o.b. mill or factory prices.

Mr. Wooden said that as far as he has knowledge the commission has no intention of attacking the sale at uniform prices all over the country of countless small articles the public buys—like chewing gum, candy bars, safety razor blades, etc. Rather, he admitted, the commission is concerned with heavy goods like steel and cement. But when Senator McMahon (Dem., Conn.) asked him about a flat price on a newspaper irrespective of where sold, he admitted that in such a case there certainly is price discrimination.

Questions Illegality of Freight Absorption — Another interesting and significant point was made by Lynn C. Paulson, assistant trial attorney for the Federal Trade Commission, and the commission's trial attorney in the current steel case. Businessmen are more scared than they need to be, he said, because they have read into the Cement decision things that it does not contain. The fact of the matter is, said Mr. Paulson, that the Supreme Court has not yet passed on the legality of freight absorption. That issue is involved in the Rigid

GOLDEN ANNIVERSARY: Reminiscing over the 50-year history of the Mesta Machine Co., Pittsburgh, are J. R. Berg, vice-president, F. A. Mesta, vice-president and treasurer, Lorenz Iversen, president and L. W. Mesta, executive vice-president, the present officials of company. The organization was formed on Nov. 21, 1898, by George Mesta when he effected a consolidation of Robinson-Rea Mfg. Co. and Leechburg Foundry & Machine Co. Since that time the company has been favored with an ever increasing volume of business and its growth has paralleled that of the great American industries which it serves

Steel Conduit case; Count II in that case charged that it was illegal for two or more sellers to systematically match delivered prices by receiving varying mill nets, even though this condition was arrived at by independent action, without collusion. The Circuit Court of Appeals decision in this case failed to pass on this issue, so that it is up to the Supreme Court to make a ruling. Mr. Paulson criticized the commission's order in the conduit case for assuming that suppression of competition is the inevitable result of matched prices.

Making it clear that he was not speaking for the commission, Mr. Paulson declared that in his opinion sellers should be encouraged to compete for business, and to absorb freight to do so.

Industry Ready To Move—One of the impressive witnesses was C. A. Winslow, ex-mayor of Watertown, N. Y. The mainstay in that city, he said, is the New York Air Brake Co. which, as a consequence of the Cement decision, has taken an option on a Pittsburgh district site and is getting ready to move its plant there.

That the Cement decision applies to steel warehouses just as much as it applies to the mills was brought out by Johns H. Congdon II, vice president, Congdon & Carpenter Co., Providence, R. I. The effect is to force this company to sell within its freight rate territory since it cannot afford to incur the danger of triple damage suits which might be brought if the company were to absorb freight.

Steel Trade's Views—Steel industry spokesmen were a unit in declaring that no merit whatever is reflected in the industry's forced adoption of an f.o.b. mill pricing policy.

The steel men asked that Congress legalize freight absorption to permit free competition for business in all parts of the country without regard to freight rate advantages or disadvantages. Unless freight absorption is permitted, they said, some steel producers will thrive on the basis of local monopolies—but others will be driven out of business when normal competition again is reflected in the sale of steel. And the trend toward local monopolies will be intensified as more and more consumers locate their plants in the back yards of steel mills.

Plant Location—No answer to the present problem is to be found in moving steel plants, as some interested parties have predicted. First, it now costs $200 to $300 to construct capacity for producing one ton of finished rolled steel—which is about 2½ times the cost in the 30s. Second, steel producing plants must continue to be located, as at present, at points where raw material assembly costs are favorable.

On two other points the steel men agreed; conspiracy and collusion in the fixing of prices should continue under legal ban, and the charging of phantom freight under no circumstances should be permitted. The big distinction, it was pointed out, is that a charge for phantom freight is a fictitious freight—as charging railroad freight rates when deliveries are made by truck at lower cost—whereas freight absorption is a concession by the mill to get business at remote points to which competitive mills have a lower freight.

Must Be Systematic—The steel men also agreed that it is not feasible to follow a policy of meeting competitors' delivered prices in individual instances in good faith. The green flag on meeting of competitors' delivered prices is good only if such practice may be pursued in a systematic way. To hold a customer not in your freight territory, it was pointed out, you must supply him regularly with all or a certain portion of his requirements, which means you have to follow a systematic policy of selling to him at the lowest delivered price of a competitor. You lose your customer when you are unable to sell him consistently at the competitor's price.

INDUSTRY'S HELP NEEDED

ALTHOUGH the Capehart committee hearings are excellently organized to assist newsmen in their coverage, the stories published to date have been disappointing. Full implications of the recent court interpretations have not been brought home forcibly to the public.

Here is a situation where manufacturers can help. Industrialists whose security is threatened by the necessity of selling within a narrow territory can help develop public understanding of their problem. Where manufacturers and businessmen are forced to withdraw from markets, they should give full details to their local newspapers and other publicity media, and to the local board of trade or chamber of commerce, to local civic officials, to the Capehart committee and to their representatives in Congress.

Proponents of remedial legislation to cancel out the effects of the Cement case decision believe such a campaign will be necessary to force consideration of such legislation by the 81st Congress.

Tobin Sees Another Wage Round

THE TRUMAN administration expects a fourth round wage increase. Secretary of Labor Maurice J. Tobin tacitly admitted as much at last week's AFL convention in Cincinnati when he stated that earnings of some 16 million workers are 9 per cent behind the third round of postwar wage increases already received by mass industry employees.

Answering a news conference question as to whether a fourth round of increases is inevitable, Mr. Tobin replied that in certain fields "workers haven't received a third round yet." In business circles, executives generally are now agreed that new demands are practically certain. One business research organization predicts that the increase finally agreed upon will range from 7 to 10 cents an hour.

To Cash in on Elections—Behind-the-scenes activity at Cincinnati reveals that AFL leaders are planning heavy pressure on Congress and a supercolossal publicity drive to cash in on the recent elections. Repeal of the Taft-Hartley Act and raising of the minimum wage are, of course, the main objectives. Representatives of the Screen Actors Guild are well represented on the union's publicity committee, and a 10-cent levy on all AFL members is expected to provide a $1 million publicity fund.

CIO Meets in Oregon This Week

CIO MEMBERS have been pouring into Portland, Oreg., in a holiday mood for their annual convention which begins today. The present outlook is that they will do these things at the meeting:

Celebrate the election of President Truman and a Democratic Congress.

Continue the Political Action Committee.

Whoop it up for repeal of the Taft-Hartley Act.

Re-elect Philip Murray as CIO president. Now 62, Mr. Murray is ending his eighth year as president. He will probably be unopposed.

Come out clearly for the Marshall Plan. Attack high prices and profits. Approve a legislative program for the 81st Congress.

Urges Help for Small Business

Congressman Ploeser tells tool and die men at Milwaukee convention that government agencies should be set up to assist small and medium size firms

THE Department of Commerce and the Federal Trade Commission should be overhauled in the interest of much more help to small business men, such as tool and die makers, who cannot afford elaborate statistical and marketing setups, and who must be protected from competition of the "steamroller" variety.

That was what Congressman Walter C. Ploeser (Rep., Mo.), chairman of the House Small Business Committee, said last week speaking to more than 200 members of the National Tool & Die Manufacturers Association in convention at Hotel Schroeder, Milwaukee.

The congressman, who characterized the tool and die men as a group typical of small and medium size entrepreneurs that make up the backbone of American industrial enterprise, urged that the State Department be strengthened as an agency for development of foreign trade. His experience on trips abroad has been that attaches all too often have no sense of responsibility to business men and take a supercilious attitude toward them. Their opposite numbers from England, however, are boosting British trade at every opportunity.

Improve Services — Mr. Ploeser urged, too, that technical services of the Bureau of Standards, the seized foreign patents and technical information and certain researches by the Office of Technical Services be made more readily available to small manufacturers who cannot afford large research and engineering departments. In conclusion he said: "Politically speaking, small business doesn't want 'handouts', nor does it want price control."

Another speaker at this third national meeting of the association who touched on the international situation as it affects American business, was A. G. Bryant, vice president, Cleereman Machine Tool Co., Green Bay, Wis., and immediate past president, National Machine Tool Builders' Association. Mr. Bryant, who has just returned from Europe, reiterated his conviction that foreign aid under the Marshall Plan immediately should be shifted from consumer goods which satisfy immediate appetites to capital goods which will make for permanent recovery. America must tell Europeans how to spend Marshall Plan funds, as well as furnish these funds, said Mr. Bryant.

Management—The meeting, which went on from Sunday, Nov. 14 through Wednesday Nov. 17, largely was devoted to inspiring management and marketing methods among contract tool and die shops which not only will prevent destructive competition among such shops but which also will lead more production shops to rely on the contract shops as complete services for production tooling.

Representing, as it does, about 500 leading tool shops, this association already has made great headway in developing the art of quoting on tool and die work from mere "guestimating" to estimating based on sound knowledge of costs and overhead expenses.

One of the most interesting sessions was that on Tuesday afternoon, devoted to incentive plans in the tool and die industry. S. A. Peck, executive vice president, Trundle Engineering Co., Cleveland, was the guest speaker, basing his talk on consulting work by his company in the shop of one of the association members. An open forum was held on estimating which proved that "snap quotations" on a given job ranged all the way from 50 to 300 hours. Methods of breaking down a job operation by operation were discussed.

Officers of the Association for 1948-49 were installed as follows: President, J. J. Kohl, president, International Tool Co., Dayton, O.; first vice president, Centre W. Holmberg, president of Aug. W. Holmberg & Co. Inc., New York; second vice president, R. H. Cope, manager, Bunell Machine & Tool Co., Cleveland; treasurer, J. H. Stanek, treasurer of Stanek Tool & Mfg. Co., Milwaukee; secretary, Alfred Reinke, vice president, Gus Reinke Machinery & Tool Co., Hillside, N. J. George S. Eaton was reappointed executive secretary.

By vote of the membership NTDMA is to be incorporated under the laws of Ohio as a nonprofitmaking organization.

J. J. KOHL

CENTRE W. HOLMBERG

Remarks Incorrectly Reported

REPORT in STEEL, Nov. 8, page 62, of the panel discussion at the recent joint meeting in Chicago of the Blast Furnace & Coke Association of the Chicago District and the Eastern States Blast Furnace & Coke Oven Association, in which a 2000-ton per day blast furnace was discussed, incorrectly stated the remarks of William S. Unger, Carnegie-Illinois Steel Corp., Pittsburgh.

Specifically, Mr. Unger's remarks should have read: (1) The height of a stove containing checkerwork 110 ft high would be about 130 ft high. (2) Total heating surface of the blast furnace stove usually is based on 500 sq ft per ton. (3) Working volume of a 2000-ton furnace should be about 55,900 cu ft.

Coal Gasification Pushed

Full-scale research into coal conversion launched with opening of Library, Pa., pilot plant

FULL-SCALE research into conversion of coal to synthetic gas for factories and homes and for providing numerous important by-products was launched last week with opening of a pilot plant at Library, Pa.

The $500,000 plant, financed jointly by Pittsburgh Consolidation Coal Co. and Standard Oil Co. of New Jersey, is said to be the first of its kind. Successful operation of the pilot plant may result in eventually revolutionizing the soft coal industry, it is said.

The Library plant will concentrate on finding methods of lowering the cost of converting coal into gas. Not only is the gas useful for fuel but from it can come gasoline, diesel fuel, tar products and chemicals for the plastics industry.

Coal Processing—At the ceremony opening the pilot plant it was predicted that perfection of continuous soft coal processing methods now being tested will increase the dollar value of mined coal by the chemical recovery of valuable organic materials before coal is burned for its heat values in the usual manner.

Gasification at the new pilot plant is accomplished through reaction of steam and oxygen with fluidized coal at a high temperature. The product is a mixture of carbon monoxide and hydrogen. In commercial production the gas could be sold for low-heat content uses such as steel, glass and brick making; enriched to the equivalent of natural gas; or fed to a reactor for production of gasoline, oils and chemicals.

Look For Answers—It's not known yet how long it will be before construction of a full-scale commercial plant can be contemplated or how great its capacity could be, but these answers are expected to be arrived at through research at the pilot plant.

George H. Love, president, Pittsburgh Consolidation, said that "while growing energy demands are expected to increase the use of coal in solid form, establishment of new uses will add security to the industry's future."

Kaiser Acquires Steel Plant

PURCHASE of the Phoenix-Apollo Steel Co. steel plant at Phoenixville, Pa., for approximately $3,600,000, was announced last week by the Kaiser-Frazer Corp. Edgar F. Kaiser, general manager, said the contract becomes effective Dec. 31.

Plant includes 6 open hearth furnaces, a blooming mill, two finishing mills and a structural mill. Present monthly output is about 26,000 tons of steel products.

Plans call for formation of a new corporation to operate the plant at Phoenixville, with present management retaining supervision. The new company will be headed by David Thompson who now is president of the Phoenix-Apollo company.

At the same time the Phoenix Bridge Co. will continue in operation as in the past under the direction of Clyde MacCornack, vice president and general manager.

This latest purchase by Kaiser-Frazer is another move in its effort to acquire adequate steel supply to support its automobile manufacturing operations. The Phoenixville plant will enable Kaiser to turn a substantial part of its pig iron supply into semifinished products, thus eliminating some of the costly bartering for steel which the company has been forced to engage in since it started in business.

Recently Kaiser-Frazer leased a government-owned blast furnace at Cleveland operated by Republic Steel Corp. This furnace has capacity to produce about 38,000 tons of steelmaking iron monthly. It is being operated by Republic at present under an agreement with Kaiser, but this agreement is scheduled to expire in a few months. Meanwhile, Republic Steel is continuing its fight to obtain possession of the plant.

Battle For Ohio Canal Renewed

HEARINGS were held last week by United States Army engineers on the proposed $439 million Lake Erie-Ohio River canal. This represented renewal of a 31-year battle which has been waged between opponents and proponents of the 105-mile waterway. Army engineers estimate it would take nine years to construct and complete the inland waterway.

The canal would extend from Beaver, Pa., on the Ohio river and Ashtabula, O., on Lake Erie and would follow the courses of the Mahoning and Grand rivers. It would provide a navigable water link between Lake Erie and the Gulf of Mexico.

Most opponents of the project are banded together in the Upper Ohio Valley Association which has labeled the canal "costly and unnecessary," adding that it would amount to $110 million more than the cost of the Panama canal. Groups favoring the project are organized in the Ohio River Improvement Association. The hearings were based on a report submitted in August, 1947, by Col. Walter E. Lorence, then district engineer for the Pittsburgh area.

Upholds Portal Pay Ban

REFUSAL by the Supreme Court last week to review the decision of a lower court that the law passed by Congress in 1947 retroactively canceled overtime "portal-to-portal" pay claims, upheld, in effect, the congressional action. Questions were raised at the time of the law's passage as to whether Congress had the right to make the law apply retroactively.

The law was passed while the suit of employees of B. H. Hubbert & Son Inc. was pending and the Federal District Court in Baltimore dismissed the pay claims on the company's contention that the new law barred them. The Circuit Court in Richmond, Va., upheld the District Court, causing the employees appeal to the high tribunal.

Although it refused to review this case, the Supreme Court at the same time deferred action on a request by a group of employees of General Motors Corp. that it rule on the constitutionality of the act. Their claims were thrown out by the District Court in Buffalo, and the Circuit Court in New York also upheld the lower court.

Plating Laboratory Opened

FORMAL opening of Hanson-Van Winkle-Munning Co.'s electrochemical laboratory at Matawan, N. J., was observed Nov. 17 with company-conducted inspection tours of the new building, a dedication and a reception on the premises. The laboratory with more than 15,000 sq ft of floor space in its three stories was specifically designed and erected for carrying on experimental and service work in the electroplating and polishing field.

Complete apparatus for experimental and sample cleaning, pickling, plating and anodizing is located in the plating room on the first floor. Most of the final tests from which will come concrete recommendations and contributions to the industry will be conducted here.

On the second floor of the building is located a large analytical laboratory devoted primarily to customer service, involving the analysis of plating solutions and investigating difficulties encountered in the application of electrodeposits.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Incoming Democratic legislators decline comment on legislative prospects pending word from White House on key measures. Radical ideas of some members worry business

THAT it won't be long now before the all-Democratic government takes over at the throttle is brought to mind by the sight of the crew of carpenters busy erecting, at a cost of $80,000, the stands for the inauguration ceremony to take place Jan. 20 in front of the capitol.

Also, numerous Democratic congressmen are in Washington now that the election is over. Some of them are here to renew leases on apartments, newly elected members are looking for living quarters, and many others just like to be in Washington.

Asked to comment on legislative prospects, most of them say frankly that the key bills—repeal or amendment of the Taft-Hartley Act, allocation of scarce commodities, control of prices and other anti-inflation factors, public housing, expansion of social security, broadening of the reclamation program, establishment of permanent price supports for farm products—will come from the White House. That seems to be the dominant note among the exultant Democrats—that the big thing that came out of the elections is the mandate the people gave to President Truman.

To Keep Promise — For example, when Sen. Elbert Thomas (Dem., Utah), slated to be chairman of the Senate Labor Committee, was asked whether the Taft-Hartley Act would be repealed outright or amended, he merely said that the Democratic campaign promise would be kept, and that a labor bill was being prepared by the administration. Numerous other congressmen have commented to the same general effect; they have some ideas of their own, but usually wind up with the opinion that the main legislative program will not be launched until President Truman sounds the pitch.

President Truman's program is expected to be hard enough for many business men to swallow. However, business men appear due for considerable worry when they read next year about what is going on in Congress. This is because of radical ideas held by some of the congressmen.

O'Mahoney To Take Over — Among returning senators is Joseph C. O'Mahoney (Dem., Wyo.) who is due to succeed Senator Robert A. Taft (Rep., O.) as chairman of the Joint Congressional Committee on the Economic Report. In this position Mr. O'Mahoney will probably hold the public eye as he did when he was chairman of the old Temporary National Economic Committee. The Committee on the Economic Report, it will be recalled, is the one that specializes on a study of the instruments the government may or could use in directing the economic trend—as fighting inflation on the one hand or deflation on the other.

Here is part of the anti-inflation program which Senator O'Mahoney proposes to introduce in Congress, according to what he told a press conference a few days ago: 1—He will introduce a peacetime profits tax similar to the bill he introduced at the last session, "to collect what are really excess profits, without hampering small business production"; 2—He will again introduce the O'Mahoney-Mansfield bill to provide a "cooling-off" period before price increases can become effective; large producers of basic cost-of-living items "from cigarettes and meat products to window panes" would have to give advance notice of price increases and justify the increases in public hearings.

Not Alone — Whether Senator O'Mahoney's ideas will be enacted into law cannot now be told. But he is not alone in advocating restoration of the excess profits tax, and the holding of hearings to investigate contemplated price increases. His idea about forcing manufacturers to give advance notice of price increases has the approval of organized labor, which insures that it at least will receive careful consideration. Furthermore, it fits in with the Truman philosophy in connection with the three postwar rounds of wage increases—that these wage increases should have come largely out of profits without necessitating general price increases.

Many of the spokesmen for business in Washington feel somewhat pessimistic as to the outlook for legislation of the above type. Some fancy ideas are expected to be proposed when anti-inflation proposals come up next year, and particularly when mention of the recent record-breaking profits of many corporations are mentioned in congressional debate. The next session is sure to be a trying one as far as business men's nerves are concerned.

Basing Point Report Available

ONE of the best available reports on the confusing situation resulting from recent Federal Trade Commission and Supreme Court orders and decisions in cases involving basing point price systems has been published by the Chamber of Commerce of the United States, and copies may be obtained by addressing the chamber's headquarters in Washington. Result of work by the chamber's Committee on Economic Policy, the report merely analyzes the whole situation and makes no recommendations. The purpose is to inform all interested parties as to the nature of the situation surrounding pricing policies and thus stimulate sound thinking on the subject.

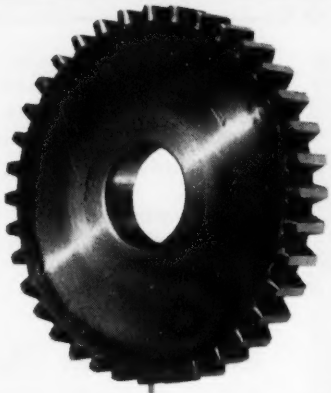
In addition to issuing the above report, the chamber's second 1948 economic institute, to be held in the chamber's auditorium in Washington Dec. 9-10 is to focus on "Delivered Pricing and the Future of American Business." Clarification of the arguments and divergent viewpoints will be undertaken by leading students of the delivered pricing problem; they have been chosen from the fields of business, law and economics.

Completes Oxygen Plant

THE FIRST tonnage oxygen plant to be used for coal gasification purposes in this country will be placed in operation within the next few weeks at the Coal-to-Oil Demonstration Plants of the Bureau of Mines at Louisiana, Mo.

Originally used by the I. G. Farbenindustrie in making acetic acid and other chemicals at Hochst, Germany, this modern Linde-Frankl unit was dismantled and shipped to the United States complete save for building, piping, and other materials available here. The plant, which will extract oxygen from the air, has a capacity of 23,000 cubic feet or 1 ton per hour of 98 per cent oxygen. A 50,000 cubic foot gas holder also has been erected.

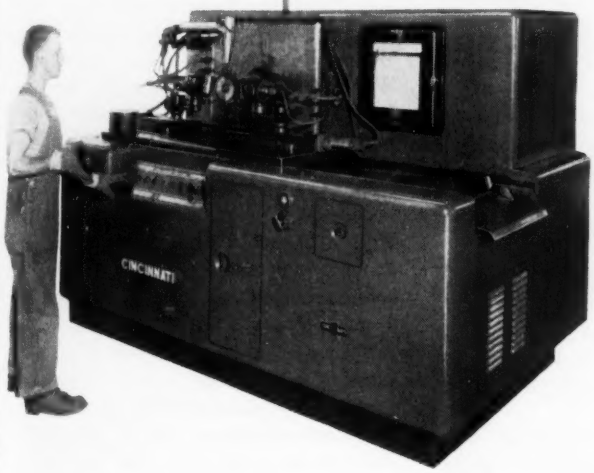
In general, this unit is similar to other Linde-Frankl plants built by the Linde Gesselschaft fur Eismachinen. It has, however, an auxiliary small column for the production of pure nitrogen which was re-



multiplied daily productio nearly 3 times

size and material	6¼" O.D., ⅞" face, SAE 8640
hardness	54-56 Rc

	previous method	flamatic method
hardening time	47 seconds	22 seconds
production	280 per day	800 per day



800 gears—a day's production

Boxed, stacked, and ready to ship are 800 spur gears—one day's production on the Cincinnati Flamatic Hardening Machine serving the O. T. Muehlemeyer Co., Rockford, Ill., heat treater who likes to keep customers happy with prompt deliveries. This spur gear (6¼" O. D., 36 teeth, 6 pitch, ⅞" face, SAE 8640) is Flamatic hardened in the range of 54 to 56 Rc (50 Rc minimum specified) to a depth of approximately ⅛". Root sections and core are unaffected. Distortion, negligible. • Operator loads gear on arbor, presses button, and Flamatic takes over: heats surface to within plus or minus 5°F of preset value (controlled by Flamatic's exclusive electronic eye) then arbor retracts and the gear is deposited in oil quench. Part after part, run after run, results are uniformly satisfactory. • Perhaps Flamatic selective surface hardening can—for you—step up schedules, improve product uniformity, cut costs, up profits. Write for interesting Catalog No. M-1611-1.

THE CINCINNATI

flamatic

HARDENING MACHINE

CINCINNATI

THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U.S.A.

quired in chemical operations at Hochst.

The Linde-Frankl plants differ basically from the conventional oxygen plants in their use of regenerative-type exchangers instead of continuous-flow, recuperative-type heat exchangers. These Linde-Frankl regenerators are steel vessels packed with coils of corrugated aluminum strips, which perform the same function as the checker-bricks in a water-gas machine superheater, alternately absorbing and giving up heat.

Incoming air is chilled to more than 300 degrees below zero (Fahrenheit) as it flows past the aluminum packing in one pair of regenerators. Meanwhile, in another pair of regenerators, outgoing product oxygen and nitrogen is cooling the aluminum packing in preparation for the next incoming air cycle. Valves are reversed every three minutes. Then frost and dry ice left on the cooling surfaces by condensation of moisture and carbon dioxide in the air is swept away by the oxygen and nitrogen streams. Regenerative exchangers thus eliminate the need for chemical removal of moisture and carbon dioxide.

Briefly, the coal gasification cycle in which the Linde-Frankl unit will be used involves first crushing, pulverizing, and drying the coal. The pulverized coal then is fed to a reactor, together with oxygen and steam or carbon dioxide. Under high temperatures, the mixture reacts to form synthesis gas—the carbon monoxide and hydrogen required in the Fischer-Tropsch process and a source of hydrogen for the coal hydrogenation process of producing synthetic liquid fuels.

Ball Quits Interior Post

MAX BALL, who has had as much to do with the formulation of government petroleum policies during the past four years as any other one man, has resigned as director of the Interior Department's Oil & Gas Division effective Dec. 1. He came to Washington in October, 1944, as assistant to Ralph K. Davies, then head of the Petroleum Administration for War. Later he succeeded Mr. Davies and continued to head up the successor organization after the war. Mr. Ball will set up in Washington as a consulting petroleum geologist.

Radioactive Tracer Handbook

METALLURGISTS and others who make use of radioactive tracers in their research work will be interested in a new government book entitled "Handbook of Radioactivity and Tracer Methodology."

Copies can be ordered from the Office of Technical Services, Department of Commerce, Washington 25, D. C., at $20 each, payment to be made to the order of the Treasurer of the United States.

The book contains 900 pages, with subject matter arranged in these three divisions: Nuclei and radioactivity; measurement of isotopes; and biological and medical applications of isotopes.

Concerned not only with tracer techniques, it deals with fundamental concepts of nuclear physics, isotope production and instrumentation. It contains numerous references to work done with cyclotron produced isotopes. In fact, the book was conceived and executed with the aim of making it a standard laboratory reference where isotopes are used.

SENATE LEADER? Sen. Scott W. Lucas of Illinois is a candidate for Democratic floor leader of the Senate in the 81st Congress, replacing Vice President-elect Alben Barkley. NEA photo

Hoffman Optimistic on Revival

EUROPEAN economic co-operation was just a hope six months ago, but today it is a fact, Paul G. Hoffman, administrator of the Economic Recovery Administration, told the National Foreign Trade Convention recently in New York.

Europe within four years can become "reasonably prosperous" by European standards, he said, adding that there is no such possibility unless the development of intra-European trade is encouraged. Mr. Hoffman said that industrial production in Western Europe was 12 per cent ahead of 1947; electric power output 10 per cent; and steel production 27 per cent.

A co-ordinated effort by American government and business to increase our purchases from abroad was urged at the meeting.

Industrial Plants "Mothballed"

FEDERAL Works Agency has been appointed as custodian for 11 surplus war plants. These warborn facilities have been transferred into the National Industrial Reserve by War Assets Administration.

The plants comprise the first group to be transferred to the reserve, and after reconditioning they will be "mothballed" for potential use in case of an emergency. Properties, listed according to wartime operator and location, are: Amco Magnesium Corp., Wingdale, N. Y.; Badger Ordnance Works, Baraboo, Wis., Bethlehem-Lebanon Forge Co., Lebanon, Pa.; Diamond Magnesium, Painesville, O.; Dow Chemical Co., Freeport, Tex.; Gary Armor Plate Plant, Gary, Ind.; Magnesium Reduction Co., Luckey, O.; New England Lime Co., Canaan, Conn.; Permanente Metals Corp., Manteca, Calif.; Oklahoma Ordnance Works, Pryor, Okla.

Transfer of these three additional plants will occur soon: Kentucky Ordnance Works, Paducah, Ky.; Keystone Ordnance Works, Meadville, Pa.; Plum Brook Ordnance Works, Sandusky, O.

Report on Jap Technical Groups

ORGANIZATION and history of Japan's three major scientific and technological societies are described in a report prepared by the staff of the Supreme Commander of the Allied Powers and now available to the public. The societies are the Imperial Academy of Japan, the National Research Council, and the Japanese Society for the Promotion of Science.

The Imperial Academy was founded in 1897 and is primarily honorific. The National Research Council was organized in 1920 in an attempt to keep pace with the evident demands of modern business and technological development. The Japanese Society for the Promotion of Science appeared in 1931, and was formed as an expedient with support coming from the highest government officials to keep Japan's technological and ideological progress in phase with moving world events.

Politics in Foreign Industry

British nationalization, German ownership issue, French strikes indicate political influence

AMERICAN metalworking executives, sensitive to the increasingly important role politics may play in United States business, are watching the political developments which are influencing British, German and French industries.

In Britain the Conservatives are marshaling forces against the steel nationalization bill. In Western Germany, France is protesting the new British-American plan to return Ruhr industry to German ownership. In France the effects of the politically inspired coal walkout are still being felt in other segments of the economy although the strike generally has been broken.

Great Britain

WHILE Britain's Conservatives prepare for a last-ditch stand against steel nationalization, the British Iron & Steel Federation declared the industry's readiness "for further constructive development of public cooperation."

In some quarters this statement was seen as an acceptance by the industry of its inevitable fate. In any event, the announcement was interpreted as a cautious hedge on the future. Conservatives will vote solidly against nationalization, and the Liberal party will also probably oppose. A few members of the government party are also expected to vote against, or at least abstain from voting. Nevertheless, Labor's overwhelming majority assures passage, and the Lords can do little more than delay it. Conservatives, however, pin most of their hopes on the next general election which follows immediately upon the "vesting day" set for May 1, 1950. In this election the Conservatives may gain enough seats to overthrow the measure.

Western Germany

BRITISH and American authorities have announced a huge interim reorganization plan under which the Ruhr's coal, iron and steel industries will revert to German ownership and control in the near future.

The French protested almost immediately. They felt the decision would be a threat to French hopes for international control of the Ruhr. The British-American plan affects all the coal, iron and steel industries in their occupation zones. Since the war these basic industries have been owned technically by the military governors of the two zones.

FURNACES STOKED AGAIN: Industrial furnaces in France are being stoked again as result of the truce in the French coal mine dispute. The mine stoppage contributed heavily to the faltering in French recovery. NEA photo

Under the re-organization plan, the governors are retaining certain control powers but are setting up new companies to operate the industries. Many of the newly established independent steelmaking companies will be re-integrated into the parent concerns. About eight to 14 independent, but vertically integrated steel companies will take over the Ruhr. Each new firm will have about 1 million metric tons of raw steel capacity annually; each will include rolling mills and other finishing capacities in order to assure a well-balanced structure from pig iron production to finished products. Some of the smaller American steel firms will serve as a yardstick for the organizational and facility setup in Germany. The question of how the trade unions and the old Ruhr companies will participate in the new arrangements is still up in the air.

The plan specifically bans from positions of ownership and control persons who permitted or encouraged the Nazi party. The announcement stressed the interim nature of the plan and said it would not prejudice any future decisions by a German government as to whether the industries should be socialized.

Although France is protesting this plan, she has also agreed on the delivery of Lorraine and Normandy iron ores to the Ruhr. Although only several hundred thousand tons are involved, the political aspects of the deal may be important because hereby the French tacitly agree to the preponderance of the Ruhr in European steelmaking. Heretofore, the French have insisted that the ores were needed for its own steel industry.

October iron and steel production hit 610,254 metric tons of ingots, compared with 571,714 in September. Ruhr production for the first time since the war exceeded French output. The annual target of 10.7 million tons of ingots for the Ruhr may be boosted to 12.5 million tons. Pig iron output for the month was increased from 468,714 tons to 508,594.

France

AS OF Nov. 1 France had lost 3,600,000 tons of coal as a result of the strikes.

The strikes, although about over, hit electricity output, and production in heavy industries has been curtailed. Output of pig iron fell from 602,000 tons in August to 507,000 in September, which is still 101 per cent of September, 1938, production. Steel output dropped from 601,000 tons in August to 550,000 in September, or 108 per cent of the tonnage for September, 1938. Hot-rolled steel, however, showed a production advance, with 414,000 tons turned out in September, compared with 371,000 in August. Only 7217 automobiles rolled off French assembly lines during September, compared with 7284 in September, 1947, and the 15,200 month-

ly average for 1938. However, 7652 commercial vehicles were manufactured during the month, compared with 6893 in September, 1947, and the 3750 monthly average for 1938.

Foreign Trade To Get Aid

FOREIGN trade will be stimulated as a result of the recent national elections, according to consensus in New York trade circles. The Democratic executive and administrative branches of the government are expected to strengthen the position of the Economic Co-operation Administration,

Reciprocal Trade — Foreign trade interests expect a strong revival of the Reciprocal Trade Agreements Program and a probable extension of the permissive act for three years instead of one. Congress also may restore the President's power to negotiate trade agreements without requiring hearings by the Tariff Commission and a report by the President to Congress.

Negotiations which are scheduled to begin in Geneva next April with 11 additional countries are expected to result in further tariff cuts through multilateral agreements rather than bilateral agreements. Conclusion of these agreements would bring the total to 34 nations under the General Tariff & Trade Agreement.

The State Department will hold hearing beginning Dec. 7 on proposed tariff cuts on several hundred products which it listed recently.

Adoption of the International Trade Organization Charter is more likely with Democrats in control of Congress.

September Exports Decline

DESPITE heavier shipments under the Marshall Plan, U. S. exports in September declined for the third straight month and reached the lowest point in nearly two years. The Commerce Department reports that September shipments fell to $926.5 million, $61.7 million below August.

Major factor in the decline was a decrease of $40.8 million in the Army's shipments of civilian relief supplies for occupied areas which were at $60.8 million in September.

Imports of goods from other countries at $558.2 million for the month were off $40.2 million from August. Although imports decreased, the export surplus figure which was $368.3 million for September, was the smallest since October, 1946. This reflected a long continued movement of exports and imports toward a closer balance.

Exports during the first nine months of 1948 were 19 per cent below the same period of 1947 while general imports were 24 per cent above the 1947 level.

Canada achieved a favorable trade balance with the United States of $11.4 million in September, the first credit balance since August, 1945.

Report Steel Export Drop

Overseas ferrous shipments continue decline in August. Year's total also below 1947

IRON and steel exports declined still further in August to continue the downward trend started the first of the year. Total ferrous exports for the month aggregated 308,484 net tons, compared with 320,190 tons in July and 525,853 tons in August, 1947.

Overseas shipments for the first eight months of the year are almost 1.3 million net tons below those for the corresponding period in 1947. Sizable declines in shipments for this period are noted in most categories, with major reductions being in ingots, blooms, billets, slabs and sheet bars; concrete reinforcing bars; steel bars (excluding alloy); black steel sheets and rails.

Increased shipments, however, were recorded in a few categories during the first eight months of this year compared with the corresponding period in 1947. Leading the list was tin plate and tagger's tin which not only increased more than 50,000 tons over last year but led all ferrous products in tonnage exported during the period reported. Seamless casing and oil line pipe with an increase in shipments of more than 70,000 tons recorded the largest increase both in tonnage and percentagewise.

U.S. EXPORTS OF IRON AND STEEL

(Net Tons)

	August	Eight Months Total—1948	Eight Months Total—1947
Semi-Finished and Finished Products:			
Ingots, blooms, billets, slabs, sheet bars	14,380	169,995	314,672
Wire rods	2,814	28,920	40,607
Skelp	7,081	38,930	45,128
Iron bars	70	3,105	29,588
Concrete reinforcement bars	10,547	94,570	169,021
Steel bars, cold finished	4,091	32,481	69,632
Other steel bars (excluding alloy)	21,606	217,410	372,442
Alloy steel bars	2,672	43,151	150,874
Welding rods, electric	966	10,996	9,159
Boiler plate	2,293	23,794	27,258
Other plates, not fab	23,443	233,862	385,933
Plates, fab., punched or shaped	1,642	17,985	23,811
Iron sheets, black	829	11,745	21,483
Steel sheets, black	27,419	281,171	390,019
Galvanized sheets	4,289	40,464	53,876
Strip steel, cold rolled	4,727	37,952	60,089
Strip steel, hot rolled	4,366	47,714	72,535
Tin plate and tagger's tin	38,468	412,643	371,493
Terne plate (incl. long ternes)	574	6,358	8,187
Structural shapes, plain Structural shapes, fab	29,140	326,492	500,234
Frame and sashes Sheet piling	2,050	28,549	24,268
Rails, 60 lb per yard and over Rails, less than 60 lb per yard Rails, relaying	16,129	214,737	313,717
Splice bars and tie plates Frogs and switches Railroad spikes Railroad bolts, nuts, and washers	3,197	54,927	99,877
Car wheels, tires and axles	2,158	27,207	63,370
Seamless black pipe	2,044	14,219	11,258
Seamless casing and oil line pipe	40,676	277,884	207,292
Seamless boiler tubes	2,631	27,531	43,833
Welded black pipe	4,512	41,879	68,634
Welded galvanized pipe	2,774	27,594	49,537
Welded casing and oil line pipe	*	*	*
Welded boiler tubes	*	*	*
Other pipe and fittings	5,946	47,108	64,255
Plain wire	4,937	49,478	52,747
Galvanized wire	3,801	33,477	63,722
Barbed wire	1,698	26,695	49,824
Woven wire fencing	550	7,085	8,537
Woven wire screen cloth	452	3,774	3,907
Wire rope and strand	1,147	8,886	24,824
Wire nails	1,518	13,327	16,399
Other wire and manufactures	3,180	30,654	32,740
Horseshoe nails Tacks Other nails, incl. staples	1,001	10,182	9,531
Bolts, nuts, rivets and washers, except railroad	4,470	41,207	29,288
Forgings	2,108	18,898	22,338
Horseshoes	88	446	743
TOTAL	308,484	3,086,082	4,376,698

* Included with seamless.
Source: United States Department of Commerce.

Occupational Deferments

World War II pattern to be followed. Local boards allowed wide peacetime discretion

IN EVENT of another war, metalworking companies can expect the same occupational draft deferments for their employees as were granted during World War II.

That's the latest word from National Security & Resources Board and Selective Service officials who have been mulling over the draft deferment problem for several months.

Occupations deemed essential during World War II included smelting, refining and rolling of metal, scrap salvage, production of metal shapes and forgings, metal mining and finishing of metal products.

Boards Allowed Discretion—Federal policymakers have different plans, however, for the immediate peacetime draft. Initially they say they'll allow local draft boards wide discretion in occupational deferments. The panels would have only broad general instructions and no specific list of essential or critical jobs. Full use would be made of appeals boards to avoid injustices and hardships in individual cases.

Later on, however, NSRB officials explain they hope to have an essential job list at least for the machine tools part of the metalworking industry. It is to be compiled from information the NSRB now is in the process of collecting. As it sends out its phantom orders for machine tools contracts, the board will ask each manufacturer his current manpower needs and how much labor and what kind he would require to fill his phantom contract.

Industry To Be Protected—Then the next task will be to see that the necessary labor isn't taken by the military services. NSRB authorities reason that a machine tools manufacturer never could meet his war contracts if the skilled workers he had counted on having were in the armed forces. Board officials are even talking of sponsoring an apprentice training program for the machine tool industry to provide more skilled workers.

If the manpower answers from the tools manufacturers prove helpful, the NSRB plans to question other manufacturers on labor requirements as it sends out other phantom orders.

Business Stabilizing in Chicago

PRODUCTION gains, declining backlogs, better delivery dates and slightly higher prices show a stabilized business condition, according to the Chicago Purchasing Agents Association's survey for October.

Only 12 per cent of the firms contacted reported lower production, the lowest percentage indicating a decline in the past year. As a result of the better output, deliveries continue to improve and order backlogs continue to decline. Inventories are decreasing slightly.

Although prices show stabilizing tendencies, the trend is on a higher level.

Profit Sharing and Labor Peace

IF PROFIT sharing plans were generally adopted, chances for lasting industrial peace would be almost assured, according to Roy C. McKenna, board chairman of Vanadium-Alloys Steel Co., Latrobe, Pa., who recently spoke before the Council of Profit Sharing Industries in Chicago.

Profit sharing, said Mr. McKenna, is a reward in the form of a fixed percentage of profits to employees for efficiency, loyalty and high craftsmanship. Unlike higher-than-average pay rates which eventually nullify themselves through higher prices for the products made, profit sharing directly increases purchasing power without entering into price.

Mr. McKenna emphasized the fact that a surprisingly large number of firms which have profit sharing plans have been free of strikes since adoption of the program. Other benefits accruing from profit sharing are absence of employee sabotage, better craftsmanship, stabilized labor force and better employee relations.

The Vanadium-Alloys plan was adopted in 1920 and has paid a bonus in every year since adoption except six. The company estimates profits after taxes and after a 5 per cent return on capital and allowance for depreciation and obsolescence. Cash distribution of profits up to and including June 30, 1946, was either 25 or 27½ per cent. In 1947 and 1948, the amount of distribution was about 40 per cent.

Many Attend Meehanite Meeting

OVER 225 sales, engineering, and operating foundrymen participated in the annual research program of the Meehanite Metal Corp. at the William Penn Hotel, Pittsburgh, Nov. 11-13.

The practical foundry session included papers by A. C. Denison, president, Fulton Foundry & Machine Co., Cleveland, on "Repair of Castings by Burning In"; Dr. C. R. Austin, director of research, Meehanite Metal Corp., New Rochelle, N. Y., on "The Jominy Test and Hardenability of Meehanite Castings'"; and A. L. Hartley, chief metallurgist, Cincinnati Milling Machine Co., Cincinnati, on "Heat Treatment of Meehanite Castings."

The engineering and sales session included discussion of the following topics: "Creative Selling," by C. E. Herington, manager, Sales Engineering Department, Meehanite Metal Corp.; "Elements of Design with Meehanite Metal," by E. S. Clark, chief engineer, Meehanite Metal Corp., and H. W. Kelly, manager of foundry operations, U. S. Challenge Co., Centerville, Iowa; and "Weldments and Cast Steel Versus Meehanite Castings," by M. R. Nelson, works manager, Stearns & Roger Mfg. Co., Denver.

Austin-Hastings Machinery Show

AUSTIN-HASTINGS Co. Inc., Cambridge, Mass., distributor of machine tools, and metal working and welding equipment, is sponsoring a machine tool, metal working and welding equipment show Dec. 6-10 in the Hartford Times Radio Center Bldg., Hartford, Conn.

Calendar of Meetings . . .

Nov. 28-Dec. 3, American Society of Mechanical Engineers: 69th annual meeting, Hotel Pennsylvania, New York. Society headquarters are at 29 W. 39th St., New York.

Nov. 29-Dec. 4, 18th National Exposition of Power & Mechanical Engineering: Power Show, Grand Central Palace, New York.

Dec. 1-3, National Association of Manufacturers: Congress of American Industry, Waldorf-Astoria, New York.

Dec. 2-4, Society for Experimental Stress Analysis: Annual meeting, Hotel Commodore, New York. Society address is P.O. Box 168, Cambridge, Mass.

Dec. 2-4, Electric Furnace Steel Committee, Iron & Steel Division, AIME: Sixth annual conference, William Penn Hotel, Pittsburgh.

Dec. 2-4, American Metallizing Contractors Association: Annual meeting, Mayo Hotel, Tulsa, Okla. Association headquarters are at 773 Brownell Ave., St. Louis.

Dec. 3, Magnesium Association and Mellon Institute: Meeting on magnesium, Mellon Institute Auditorium, Pittsburgh.

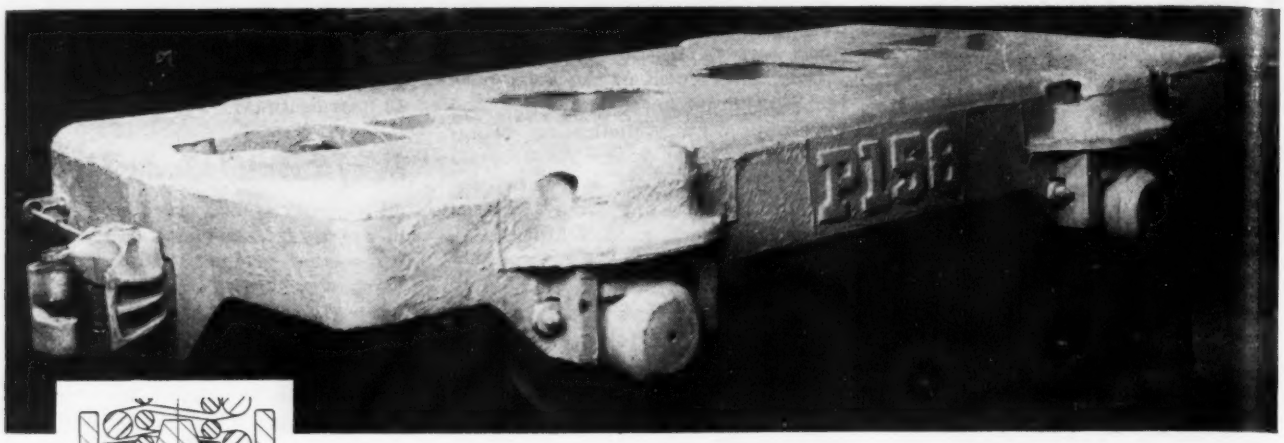
Dec. 6-8, American Institute of Electrical Engineers: Conference on electric welding, Rackham Memorial Bldg., Detroit. Institute headquarters are at 33 W. 39th St., New York.

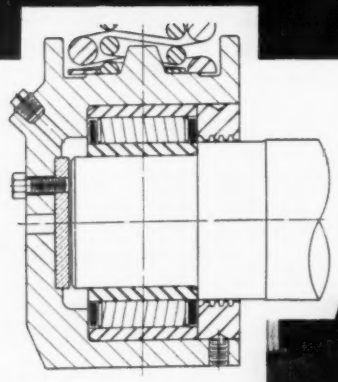
Dec. 7-8, Diesel Engine Manufacturers Association: Meeting at Union League Club, Chicago. Association headquarters are at 1 N. LaSalle St., Chicago.

Dec. 10-11, Machinery & Allied Products Institute: Fourth conference in capital goods economics, at Hotel Mayflower, Washington. Washington office of the institute is at 910 17th St., NW.

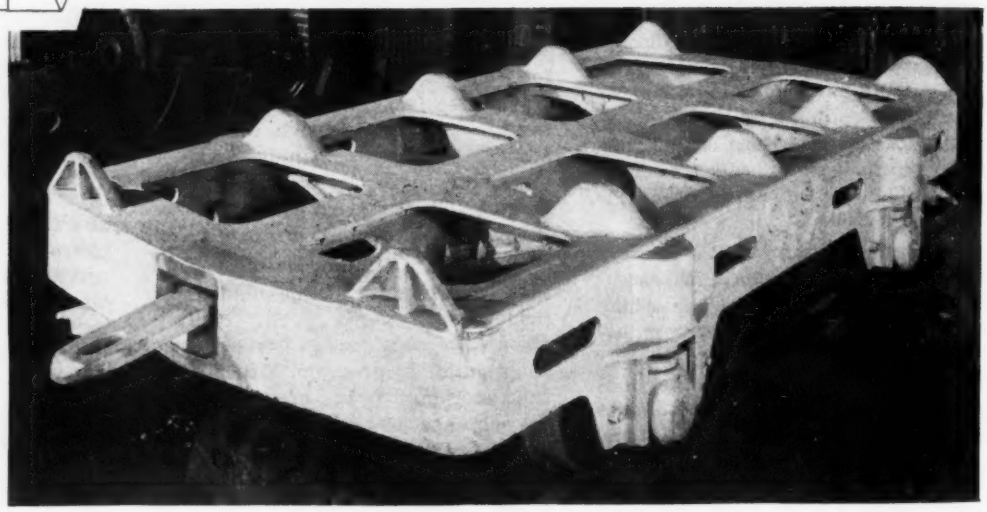
Dec. 26-31, American Association for Advancement of Science: Annual meeting, Stevens and Sherman Hotels, Chicago.

Jan. 10-14, Materials Handling Institute and American Society of Mechanical Engineers: Materials handling show, Philadelphia.





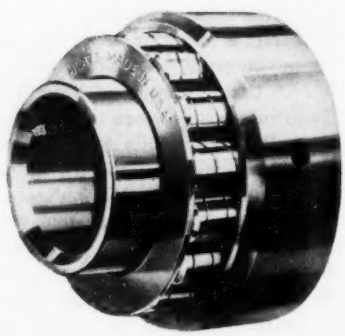
A word for the buyer of Ingot and Charging Cars



Most leading builders of open hearth cars regularly supply Hyatt equipment. Photos of Ingot and Charging Box Cars shown, courtesy of Pittsburgh Steel Foundry Corporation.

THAT WORD is HYATT because when cars are equipped with Hyatt Roller Bearings maintenance is simplified—wear is reduced—axle breakage virtually eliminated—longer trains handled more rapidly with less draw-bar pull.

All of which accounts for the reason why more than 90% of the ingot mold and charging box cars used in open hearth plants are operating on Hyatts—the preferred steel mill bearing for cranes, motors and other mill equipment, too, for over thirty years. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J., Detroit, Pittsburgh, Chicago and Oakland, Calif.



HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Chrome "ventiports" in fender sides distinguishing feature of 1949 Buicks. Engine compression stepped up. Dynaflow transmission available on Super series

DETROIT

CHROME-RINGED "ventiports" punched into the sides of front fenders on Buick's 1949 models, announced last week, are the most distinguishing feature of the new jobs and probably will elicit as much discussion pro and con as did Cadillac's fishtail rear fenders. The ports are about 3 inches in diameter and there is a horizontal row of three in each front fender of the super models and four in the roadmaster. Flexible ducts lead from the fender openings to the engine compartment, providing additional cooling much as did hood louvers which were standard in most automobiles before front fenders started swelling up over hood sides. Some manufacturers continued stamping louvers into the inner side of fenders in the effort to provide a little more through-passage for hot engine air.

While Buick engineers do not say so officially, it seems a logical assumption that the use of fender ports will result in cooler air flowing over the dynaflow transmission where dissipation of heat must be taken into consideration. The unit is provided with a positive type of oil cooler through which the 11 quarts of oil in the mechanism are constantly circulated, and the added advantage of a cooler engine compartment should further facilitate the problem of heat removal.

Distinctive in Appearance—Beyond these utilitarian angles, the fender ports certainly are distinctive in appearance, even though they might provide a convenient target for small boys looking for devilish places to lodge sticks, stones, dead birds and whatnot. Screens over the openings could quickly minimize such eventualities.

Three basic body styles are available on the new Buick lines—a two-door sedanet, a four-door sedan and a convertible—all the "C" body series which General Motors first introduced on Cadillac and the Oldsmobile Futuramic. Hood and fender treatment readily differentiates the different makes, even though the bodies come from the same dies. Buick is pioneering an entirely new design, scheduled to be in production by late spring, using the basic convertible body and attaching a solid steel top with rear window glass which sweeps well around into the sides. The top is fabric-lined on the inside and the entire concept is the answer to buyers who have said they prefer the snap and dash of the convertible lines and at the same time would like to avoid some of the rattles to which convertibles are allergic, while not caring particularly for the advantages of being able to lower the top. Identified as a solid top 6-passenger custom coupe, it will be called the Riviera. Incidentally, Kaiser-Frazer now has a hard-top convertible in the works, one version of which will be known as the Kaiser Virginian.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,236	366,205
February	399,471	393,663
March	519,154	443,588
April	462,323	445,137
May	359,996	404,191
June	454,401	421,466
July	489,736	399,456
August	478,146	364,478
September	437,181	444,501
October	506,539*	461,536
10 mos.	4,525,000*	4,144,221
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimate for week ended:

	1948	1947
Oct. 30	116,968	107,240
Nov. 6	118,229	106,651
Nov. 13	116,468	110,663
Nov. 20	114,000	115,197

Estimates by Ward's Automotive Reports

Engine Compression Raised—Dynaflow transmission now will be standard equipment on Roadmaster models, and a new unit has been tooled and placed in production for the Super series, identical with the larger transmission except for a slightly smaller "converter" member. Compression ratio of the straight-eight valve-in-head engine used in Super models has been stepped up to 6.9 to 1 and horsepower to 120 to accommodate the automatic transmission, and the engine has been fitted with hydraulic valve lifters somewhat different in design than those used by Cadillac and the new Olds V-8. Tappet oil reservoirs are larger and precautions have been taken to feed clean and air-free oil to the system to minimize tappet noise when the engine first is started.

Buick has paired its rear lamps smoothly into the after-edges of rear fenders. Each lamp now combines the functions of stop light, tail light, directional signal and reflector, being positioned high enough so that separate reflector buttons are not necessary to meet regulations of certain states, as was the case in earlier models. Another interesting electrical idea adopted for 1949 is the use of a master fusebox accessible from underneath the instrument panel or from the engine side of the dash, along with wiring lines which have special types of snap-in-connectors, readily attached or disconnected.

New Special Planned—The Buick Special series is being continued unchanged, with either 2-door or 4-door bodies of the General Motors "B" type. It was reported at Flint that an entirely new Special line would be introduced sometime in the late spring and that tooling already has been released. However, around Detroit tool shops the opinion is to the effect this outlook is a trifle premature since tooling is still in the blueprint stage. Just how long Buick will continue the Special probably will be determined by field orders, earlier indications pointed to its discontinuance this year. Another model not mentioned previously, on either the Roadmaster or Super chassis, is the so-called estate wagon, a four-door type with steel top, doors and all-steel center pillars, and is being continued in production.

In the General Motors family, only Pontiac and Chevrolet are yet to be heard from on 1949 models, and the reason for their being somewhat behind the rest of the parade probably springs from a combination of circumstances. First, commitments for materials and parts on 1948 models have to be run out and this will require operations until some time next

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BUICK FOR SPRING: One of the more distinctive 1949 models to be introduced by Buick is the Riviera, a solid-top two-door coupe scheduled for production in late spring. Built on the Roadmaster chassis, the coupe has the appearance of a convertible. All new Buick models will feature the chrome-ringed "ventiports" for identification and cooling purposes

month, and second, both will make use of the completely new "A" body series which involves a considerable amount of retooling and tryout in Fisher Body plants, at least more than what was required to make minor modifications in the "C" body for Cadillac and Olds and to adapt it to Buick.

Oldsmobile has not shown its full line of models for 1949, although it has displayed its headliner, the new V-8 engine, and is now changing over assembly facilities. A press preview of the cars themselves is scheduled for Dec. 2 and is expected to feature two general series—the present Futuramic type with V-8 engine, and the new "A" body with either a 6-cylinder engine having slightly higher compression, or the V-8.

Chrysler Plans Uncertain

CHRYSLER'S new model plans continue cloudy, and recent work stoppages resulting from disputes over production standards resulted in the loss of several thousand units of output by Chrysler and DeSoto which could further delay the transition to 1949 designs. The latter are about ready to go and some plant changes have been initiated leading to the changeover. After the turn of the year it is expected there will be a gradual slowing down in all Chrysler Divisions, as 1948 schedules are run out and as components for new models, requiring the most lead time, are brought into production. It may be well into February before the public has any inkling of what Chrysler, Dodge, DeSoto or Plymouth look like. At the moment around Detroit opinion leans to the belief they will follow current trends to a degree and will lean toward the conservative.

Orders for substantial quantities of ventilating windows for the 1949 Chrysler models have been placed with F. L. Jacobs Co. and they represent a new product in the company's list of automotive parts. Manufacture and assembly will start next month in the Jacobs Parts Manufacturing Division plant at Traverse City, Mich.

Engineering New Model Slow

SKETCHING the slow process of engineering and styling a new passenger car, Harold Youngren, Ford's director of engineering, recently pointed out in an address before the SAE that the first rough sketches for the present Ford were made Aug. 15, 1946, some 20 months before first assemblies were under way. The sketch indicated basic requirements as to seating arrangement, leg and head room and the like, and while it was the roughest sort of freehand scrawling, the actual variation between basic dimensions and the final car was not more than ½-inch.

After the original sketches came 1/10-size drawings, made Sept. 27, and with this drawing were the basic data around which the styling was developed. Next came full-size clay models, two of which were prepared for the Ford project, and even on these some last-minute changes, such as the tail lamp treatment, were introduced. The project then went to the body engineering department for production of templates and drawings. There were 1800 templates and 15,000 drawing releases furnished to manufacturing departments by body engineers.

A chassis design program, started at the same time as the styling work, progressed considerably faster so that completed chassis were ready for tests in March, 1947. They were run under reworked 1947 model bodies until July when the first hand-made bodies were ready. About 1,000,000 miles of testing were put on these cars at the Dearborn test track and in different parts of the United States and Canada. Incidentally, Mr. Youngren calls attention to the fact each experimentally built car costs 25 to 50 times as much as the final production unit.

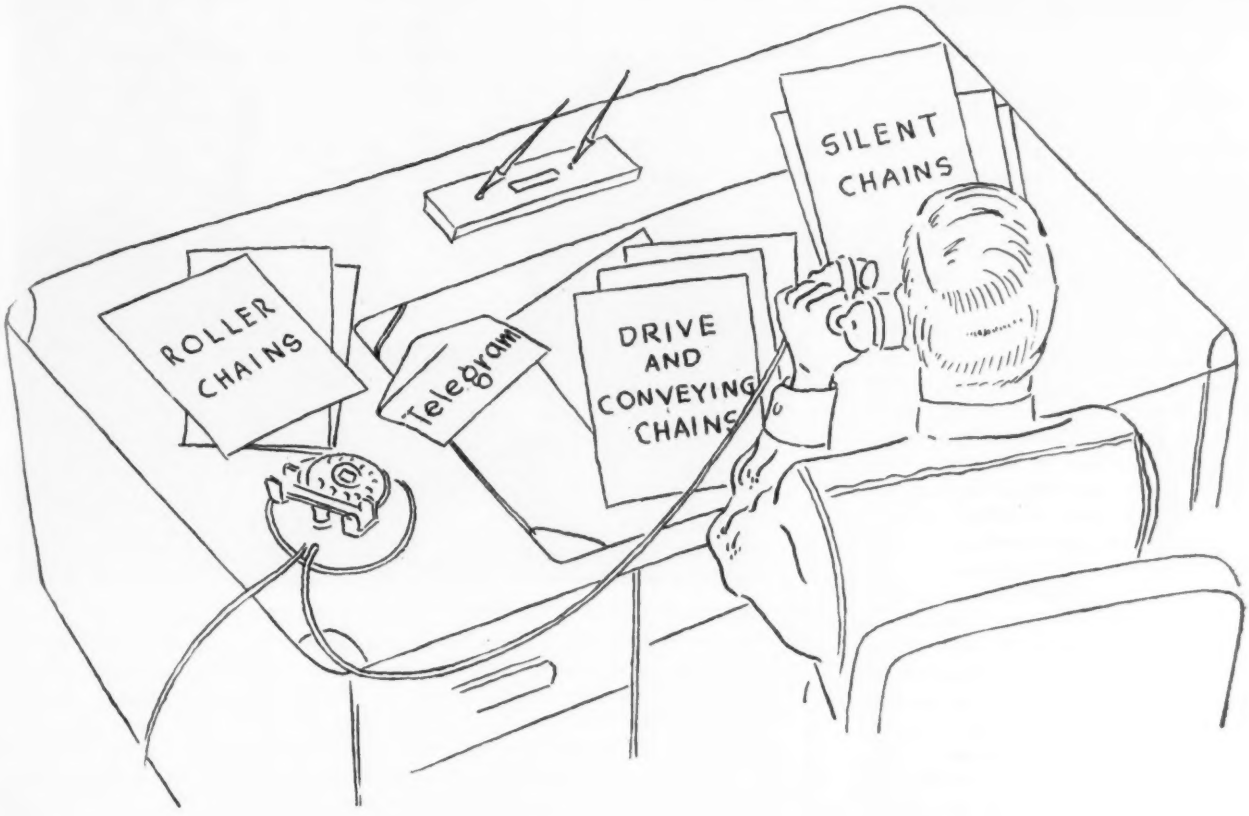
At the outset it was agreed a reduction in weight was possible by sufficient care and attention to design detail, yet without sacrificing durability or riding comfort. About 120 pounds was knocked out of the body and frame by a more intelligent use of materials and without any reduction in gages of steel used, and with even some strengthening of the body and frame unit. Another 80-odd pounds was eliminated from the remainder of the chassis units.

Ford Adds Two Truck Models

FORD has announced the addition of two new parcel delivery chassis of the forward control type to its truck assortment. The chassis are supplied with grille, windshield, front quarter windows, engine cover and tilting driver's seat. Bodies must be obtained from independent body builders which can tailor them to suit the user's particular requirements. The units are built in either 104 or 122-inch wheelbase, with maximum gross vehicle weight rating of 7800 pounds. Both are powered by the 95-horsepower, 6-cylinder truck engine.

Dodge Rearranges Foundry

GRAY Iron Foundry at the Dodge main plant in Detroit has undergone a complete rearrangement in the core department, involving relocation of baking ovens to the roof of the six-story structure to get heat and fumes out of the building. The ovens are enclosed by walls and a roof, and coremaking operations have been transferred from the second to the fifth and sixth floors. New sand handling equipment has been installed, as well as cooling tunnels for cores as they emerge from baking ovens, permitting handling into storage at a more comfortable temperature. Changes, costing into the millons of dollars, have lightened manual tasks in the core department and reduced labor needs slightly.



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- HB (hardened bearing) type chain
- BP (bar and pin) type chain

★

Finished Steel Roller Chains and Sprockets
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- Single and Multiple Strands
- Extended Pitch Series in sizes 1¼ in. to 4 in. pitch

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- All sizes ⅜ in. to 1½ in. pitch

★

Flexible Couplings
- Roller chain type
- Silent chain type

Of greatest interest to you is this: every piece of paper which crosses our desks, whether letter, telegram, engineering drawing or scribbled memo, is concerned with only one subject—Steel Sprocket Chains and Accessory Attachments.

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The Union Chain and Manufacturing Company

TRANSMIT POWER · UNION CHAINS · CONVEY MATERIALS

Sandusky, Ohio, U.S.A.

GE Instrument Exhibit

"Carnival of Measurements" embarks on 14,000-mile tour of 80 U. S. industrial centers

WITH MORE than 9000 miles of cross-country travel already behind it, General Electric Co.'s rolling "Carnival of Measurements" exhibit has embarked on a year-long, 14,000-mile tour of 80 major U.S. industrial centers.

The collection of more than 150 electrical measuring devices manufactured by the GE Meter & Instrument Divisions, West Lynn, Mass., will be displayed some 300 times in the next nine months to groups concerned with the science of measurement. This will include executives and engineers representing utilities, municipalities, industries, research laboratories and government agencies and representatives of schools, colleges and engineering societies.

Exhibit Brought up to Date—Since completion of the first lap of the tour which took it to 21 major cities in the northeastern, mid-Atlantic and midwestern states, the exhibit has been brought up to date. Recent additions to the display include the new I-50 watthour meter; the new automatic interval timer, type T-48; the phase sequence indicator; a new line of small panel instruments; an inkless-type recorder for switchboard mounting; and long-scale switchboard instruments for railroad locomotives.

The complete exhibit consists of panels on which are displayed switchboard, panel and aircraft instruments; instrument accessories and components; photometric devices and photovoltaic cells; time switches; portable testing instruments; remote position indicators; recording instruments; instrument transformers; laboratory instruments; watthour meters; and telemeters.

50 YEARS WITH COMPANY, NAMED PRESIDENT: E. W. Miller, left, was named president of Fellows Gear Shaper Co., Springfield, Vt., the day after his associates honored him with a dinner in observance of his 50 years of service with the company. Photo shows E. J. Fullam, former president and now chairman, presenting Mr. Miller a commemoratory book. R. M. Fellows has been named first vice president and treasurer; C. M. Peter, vice president and general manager; and H. T. Gates, vice president and factory manager

Eaton Buys Saginaw Plant

EATON Mfg. Co., Cleveland, has purchased a plant in Saginaw, Mich., from War Assets Administration for about $750,000.

The 175,138 sq ft comprising this plant, which was previously leased from the government and operated by Eaton since 1941, doubles the company-owned manufacturing facilities at its Saginaw Division. With the purchase of this plant, the company now owns a total of 2,650,560 sq ft of manufacturing space in Ohio, Michigan and Wisconsin.

Products manufactured at this unit include mechanical valve lifters, hydraulic valve lifters and valve seat inserts for the automotive and aviation industries, in addition to engine cooling fans for the automotive trade.

Gibson Buys Share In Phoenix

GIBSON Refrigerator Co., Greenville, Mich., has purchased Standard Pressed Steel Co.'s entire interest in Phoenix-Apollo Steel Co., which is owned by a group of several steel consumers.

Frank S. Gibson, jr., secretary-treasurer of Gibson Refrigerator, said the move was taken to insure his company an increased tonnage of sheet steel. He was recently named chairman of the steel company which has plants in Phoenixville and Apollo, Pa.

Donora Furnace Blown Out

NO. 1 blast furnace at the Donora, Pa., steel and wire works of American Steel & Wire Co., U.S. Steel subsidiary, has been blown out for relining after producing 2,003,500 net tons of pig iron. Blown in on Jan. 18, 1941, the furnace has been in continuous operation for seven years and nine months, with an average daily production approximating 700 net tons. The rated capacity is 600 net tons per day.

Estimates range from 60 to 65 days to complete the relining project. A. E. Anderson Construction Co., Buffalo, has the relining contract, while American Bridge Co. will do the structural work.

Lukens Gives Student Aid

LUKENS Steel Co., Coatesville, Pa., has established a scholarship grant for deserving students of Scott Senior High School in Coatesville who may desire to pursue an engineering career.

The Lukens board of directors has appropriated a $4000 fund for the purpose. This sum will be payable in four annual installments to a student who is deserving and in need of financial assistance to secure a college education. College engineering courses selected must be one of the following: electrical, mechanical, chemical, metallurgical, oil or civil.

Continental Can Plans New Unit

CONTINENTAL Can Co., New York, has purchased land in Milwaukee and plans to begin construction some time next year on a $5 million can-making plant.

Last year the company was unsuccessful in efforts to buy a surplus government plant in the area. Rising freight rates and desire of the brewing industry for more cans are among the factors which influenced Continental to plan a factory for Milwaukee.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Bedford Tool & Forge Co., Bedford, O., manufacturer of hand and pneumatic chisels, has appointed Milwaukee Chaplet & Mfg. Co., Milwaukee, as its representative in Wisconsin and western Michigan.

—o—

General Electric Co., Schenectady, N. Y., reports it is manufacturing the propulsion equipment for more than one third of the 20 oil tankers now being built or contracted for in American shipyards.

—o—

Ampco Metal Inc., Milwaukee, has named the following distributors for its line of welding electrodes: Allied Weld-Craft Inc., Indianapolis; Arizona Welding Equipment Co., Tucson, Ariz.; and Welder Service Co., Toledo, O.

—o—

Cutler-Hammer Inc., Milwaukee, manufacturer of motor control and allied electrical apparatus, has opened a branch sales office at 533 Mayo Bldg., Tulsa, Okla. B. R. Stratton is in charge.

—o—

United States Steel Supply Co., Chicago, a U.S. Steel Corp. subsidiary, will soon be able to serve steel users in the Pacific Northwest from warehouses at Portland, Oreg., and Seattle. Columbia Steel Co., another corporation subsidiary, will transfer to the supply company its Portland and Seattle warehouse plants.

—o—

Purolater Products Inc., Newark, N. J., manufacturer of filters, will build a $1 million plant in Union Township, west of Newark, and will consolidate manufacturing now centered in two old locations.

—o—

Ernest J. Schabelitz, Rincon, Calif., has been granted a patent on a method for removing objectionable substances from coal so that it will be suitable for coking. The process is seen as an aid to western steel industry since the area has an abundance of coal which cannot be converted to coke "as is."

—o—

U. S. Government will sell or lease the aluminum reduction plant at Riverbank, Calif., which originally was scheduled to go into the industrial reserve in case of emergency. Plans were changed because of the aluminum shortage.

—o—

New York State reports nearly 7 million tons of iron ore have been mined in the Adirondack area so far this year. Industry has spent $40 million since shortly before World War II in developing the mines.

—o—

Rheem Mfg. Co., San Francisco, has been awarded a patent on a phase of its new method in manufacturing galvanized containers. Patent covers the company's method of assembling zinc coated containers after galvanizing.

—o—

United States Air Force is converting 10 of the D-35, "flying wing" type aircraft to turbo-jet engines. This modernization is now in progress at the Northrop Aircraft plant at Hawthorne, Calif.

—o—

Stewart-Warner Corp., Chicago, has acquired Heating Research Corp., Anderson, Ind., maker of a convection type gas heater, and will integrate the business with its South Wind Division at Indianapolis. Allan W. Lundstrum, president, and other key personnel of the company will join the Stewart-Warner organization.

—o—

American Standards Association Inc., New York, announces it will conduct a seminar on the organization and technique of standardization work, particularly in individual companies, from Jan. 24 through Jan. 28 at the Engineering Societies Bldg., New York.

—o—

Binks Mfg. Co., Chicago, manufacturer of spray painting and water cooling equipment, has established a Customer Service Department to centralize all information services formerly scattered among several departments. Unit is under the direction of Joseph Vokoun.

—o—

American Washer & Ironer Manufacturers' Association, Chicago, reports that sales of standard-size household washers in September climbed to 433,919, highest in history.

—o—

F. A. Smith Mfg. Co. Inc., Rochester, N. Y., manufacturer of electrical equipment, has changed its name to Fasco Industries Inc. There is no change in management, policy or products.

—o—

War Assets Administration has leased a plant at Johnson City, N. Y., to General Electric Co. and a unit in Milwaukee to A. C. Spark Plug Co. for production of military equipment for the Air Force.

—o—

Titeflex Inc., Newark, N. J., manufacturer of flexible metal hose and tubing, filters, lubricator valves and other products, has named Manufacturers Sales Agency, Pittsburgh, as an agent in western Pennsylvania and West Virginia.

—o—

Marcus Transformer Co. Inc., Hillside, N. J., has appointed W. E. Holiman Co., Houston, Tex., as its sales representative in Texas, Louisiana and Oklahoma.

—o—

Pittsburgh Plate Glass Co., Pittsburgh, has acquired controlling stock interest in Midvale Coal Co. The firm is being liquidated and its mine near New Philadelphia, O., will be operated as the Columbia Coal Division of Pittsburgh Plate Glass Co.

—o—

Straub Mfg. Co. Inc., Oakland, Calif., announces that Pennsylvania Crusher Co., Philadelphia, has acquired exclusive manufacturing and sales rights in eastern United States and Canada covering the Kue-Ken line of jaw crushers and gyratory crushers. Pennsylvania is a subsidiary of Bath Iron Works Corp., Bath, Me.

—o—

Montreal Locomotive Works Ltd., Montreal, Que., and Canadian Locomotive Co. Ltd., Kingston, Ont., have received a $14 million order for the production of 100 steam locomotives for the Indian Government Railways.

50 FOR SKINNER

M. B. SKINNER Co., South Bend, Ind., is observing its fiftieth anniversary as a manufacturer of repair clamps and service fittings for steel and cast iron pipe and drilling equipment for service installations. In the highly specialized manufacture of repair clamps and service fittings, the company has practically no competition. These devices are used to repair breaks in water, gas and oil lines.

The company began a profit sharing plan in 1934 and has never had any labor trouble. Employee turnover is practically nil, the average length of time with the company being 12 years. K. G. Merrill is company president.

The Business Trend

LEVELING off slightly below the postwar record peaks, industrial production as reflected by STEEL's index was at 175 per cent (preliminary) of the 1936-1939 average for the week ended Nov. 13. However, new records are being set almost weekly by the petroleum and electric power industries to give material assistance in maintaining industrial production at the current high levels.

STEEL—In the forefront of industrial activity for the last few months, the steel industry has added a number of production records to the growing list of postwar and all-time highs that have been set this year. October's output of steel for ingots and castings was the highest month's total in war or peace, and production for the week ended Nov. 13 resulted in an all-time weekly high, topping the former record set in the wartime week ended Apr. 24, 1944.

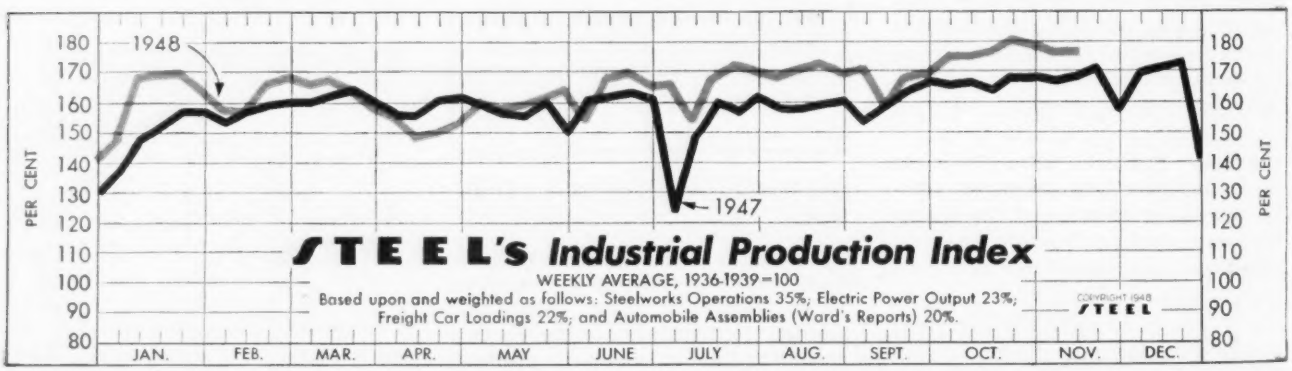
AUTOMOBILES—Outturn of passenger cars and trucks, on the other hand, trails the figures of a few weeks ago because of decreased assemblies resulting from model changeovers and scattered strikes. Loss of an estimated 3400 units in the week ended Nov. 13 was caused by the idling of 15,000 workers at four Detroit area plants. Total industry production at 116,468 units was 1761 below preceding week.

POWER—Major electric utility system peak loads for September reached an all-time high of 47,960,000 kilowatts, higher by 0.9 per cent than the previous record reached in December, 1947, according to the Federal Power Commission. Energy requirements for September at 23.2 billion kilowatt-hours were 2.7 per cent below August but 10.0 per cent higher than in September, 1947.

INCOME—Commerce Department figures point to a record national income of more than $220 billion with wage and salary earners receiving about $120 billion after taxes. Profits of the nation's corporations are estimated at about $20.4 billion after taxes, or 9.2 per cent. Although this is a new high in dollars, corporations netted $8.4 billion after taxes in 1929 which was 9.6 per cent of the total national income of $87.4 billion.

TRUCKLOADINGS—Volume of freight transported by motor carriers in September reached an all-time high of 2.8 million tons, according to American Trucking Associations Inc. September's total topped figures of the preceding month and September, 1947, by 2 per cent and 12.8 per cent, respectively. Carriers of iron and steel hauled about 4 per cent of the total tonnage and reported increases of 0.6 per cent over August and 22.9 per cent over September, 1947.

RAILROADS—Estimated net income of the class 1 railroads in September was four times that for the same month in 1947, according to the Association of American Railroads. After interest and rental, the net income was reported at $82 million as compared with $20.7 million for September, 1947. For the first nine months of this year, net income is estimated at $502 million, well above the $317 million in the corresponding period last year.



Index (chart above): Week ended Nov. 13 (preliminary) 175 Previous Week 175 Month Ago 177 Year Ago 168

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	99.0	99.0	98.0	97.0
Electric Power Distributed (million kilowatt hours)	5,571	5,564	5,482	5,084
Bituminous Coal Production (daily av.—1000 tons)	1,706	2,042	1,980	2,139
Petroleum Production (daily av.—1000 bbl.)	5,626	5,627	5,586	5,257
Construction Volume (ENR—Unit $1,000,000)	$137.8	$109.3	$170.2	$159.3
Automobile and Truck Output (Ward's—number units)	116,468	118,229	123,185	110,663

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

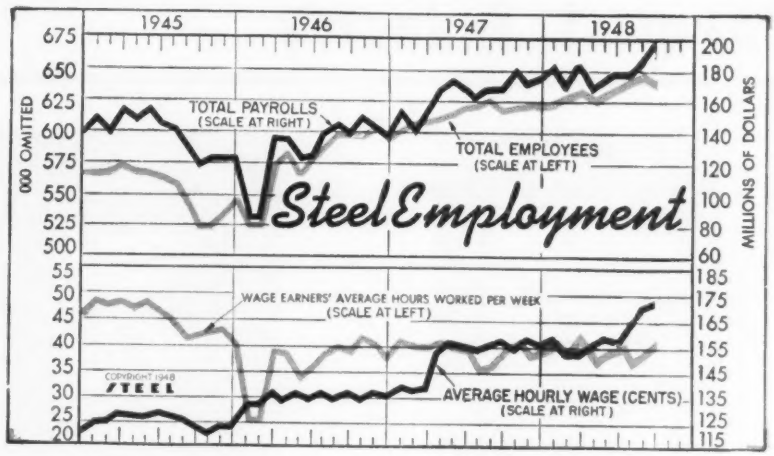
TRADE				
Freight Carloadings (unit—1000 cars)	860†	843	914	878
Business Failures (Dun & Bradstreet, number)	96	104	94	84
Money in Circulation (in millions of dollars)‡	$28,337	$28,254	$28,284	$28,709
Department Store Sales (changes from like wk. a yr. ago)‡	−8%	+2%	+10%	+10%

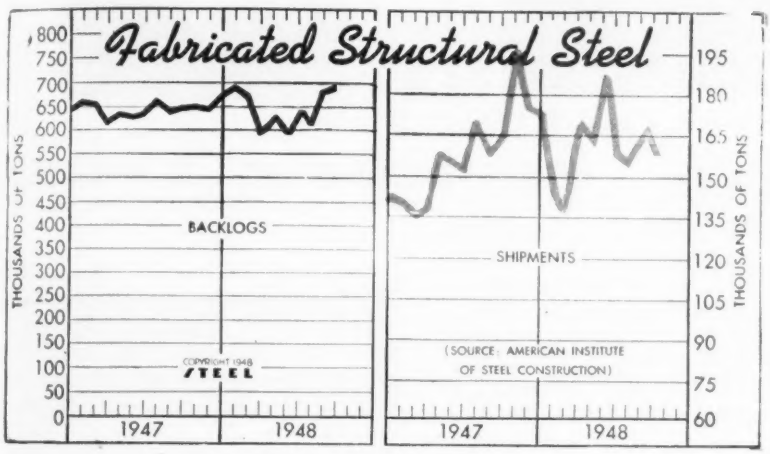
† Preliminary. ‡ Federal Reserve Board.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wages† (cents)	
	1948	1947	1948	1947	1948	1947
Jan.	622	601	$180.2	$155.8	157.3	138.1
Feb.	626	607	167.6	139.5	155.1	137.0
Mar.	629	609	183.0	150.6	154.8	137.9
April	626	611	168.5	168.3	155.1	153.3
May	628	615	175.3	175.8	157.7	155.6
June	634	623	179.5	167.6	156.9	154.7
July	641	623	179.8	163.2	164.5	153.9
Aug.	645	625	193.8	169.1	168.9	155.6
Sept.	641	618	199.4	168.9	171.8	157.1
Oct.	...	...	620	....	180.1	....	154.6
Nov.	...	...	624	....	171.0	....	158.7
Dec.	...	...	621	....	175.3	....	156.5

† Monthly average.





Fabricated Structural Steel

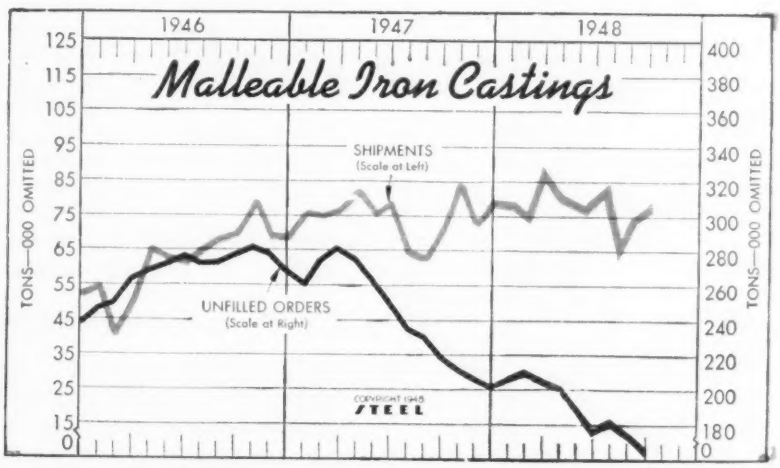
(000 Tons)

	Shipments			Backlogs		
	1948	1947	1946	1948	1947	1946
Jan.	146.4	140.6	107.5	692	661	552
Feb.	141.6	136.1	63.8	673	656	551
Mar.	167.0	137.8	102.8	597	614	605
Apr.	166.7	157.4	122.5	630	632	674
May	186.9	155.0	124.4	593	628	615
June	157.1	151.9	126.8	647	634	642
July	156.1	169.9	140.2	613	661	674
Aug.	167.2*	158.0	157.5	691	639	651
Sept.	158.8	164.3	141.9	698	648	682
Oct.	....	196.1	164.7	...	649	660
Nov.	....	175.0	157.3	...	645	665
Dec.	....	173.0	142.1	...	671	646
Total	....	1,915.1	1,551.6			

* Revised.

Malleable Iron Castings

	Shipments (000 omitted)		Unfilled orders for castings for sale (000 omitted)	
	1948	1947	1948	1947
Jan.	77.7	75.9	206	260
Feb.	75.2	74.7	209	274
Mar.	86.8	76.6	203	281
Apr.	80.6	81.9	200	275
May	76.1	75.5	192	202
June	81.7	78.5	179	249
July	64.9	64.2	180	235
Aug.	73.3	62.4	177	230
Sept.	77.8	71.6	164	218
Oct.	...	84.0	...	211
Nov.	...	72.1	...	206
Dec.	...	77.8	...	202
Total	...	895.1	...	...



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,363	$13,076	$10,842	$11,529
Federal Gross Debt (billions)	$252.4	$252.5	$252.4	$258.6
Bond Volume, NYSE (millions)	$17.8	$21.3	$11.9	$20.7
Stocks Sales, NYSE (thousands)	6,972	9,392	3,625	3,486
Loans and Investments (billions)†	$62.2	$62.4	$62.2	$64.9
United States Gov't. Obligations Held (millions)†	$33,268	$33,526	$33,235	$37,982

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$95.05	$95.05	$95.05	$76.09
All Commodities†	162.7	163.8	164.6	157.9
Industrial Raw Materials†	175.1	176.2	176.7	175.2
Manufactured Products†	158.1	159.4	160.5	151.0

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

J. E. NIEDERHAUSER

R. J. LECKRONE

JOHN A. PROVEN

J. E. Niederhauser, formerly manager of industrial relations, Continental Can Co., New York, has been promoted to the newly created post of vice president in charge of industrial relations. Prior to his present responsibilities, which for several years have encompassed industrial relations matters for the entire company, Mr. Niederhauser was in charge of industrial relations for the company's Paper & Plastics Divisions.

—o—

R. C. Brown has been appointed director of sales, Foote Bros. Gear & Machine Corp., Chicago. He was associated for 21 years with Link-Belt Co., and while with that company was Southwest Division manager. More recently, and until joining Foote Bros., he was president of Brown-Steele Co., Dallas, Tex. During the war Mr. Brown was deputy director of the General Industrial Equipment Division, War Production Board. Mr. Brown's appointment with Foote Bros. is part of a program which has resulted in the addition of modern production facilities and the introduction of newly engineered, enclosed worm and helical gear drives.

—o—

A. T. Blakemore, for the past four years connected with the Conlon Division, Conlon-Moore Corp., Chicago, has been made its sales promotion manager. **Earl Stiefel,** formerly purchasing agent, Moore Division, Joliet, Ill., previously in the same post for Round Oak Stove Co., has been made general director of purchases for both divisions and transferred to Chicago.

—o—

Bonney Forge & Tool Works, Allentown, Pa., announces appointment of **E. S. Sensenderfer** to the position of advertising manager. He returns to the automotive and industrial advertising fields after service in World War II, and a period as account executive with an advertising agency. Prior to his army service Mr. Sensenderfer was with United States Asbestos Division, Raybestos-Manhattan Inc., and the American Trucking Associations Inc.

—o—

R. J. Leckrone has been named vice president in charge of engineering and sales of the recently organized Pittsburgh Engineering & Machine Co., 1004 Plaza Bldg., Pittsburgh. This organization was the former Machinery Division of Pittsburgh Steel Foundry Corp., Glassport, Pa.

—o—

Lewis W. Rose has been appointed assistant comptroller in charge of cost and statistics for Columbia Steel Co., subsidiary, U. S. Steel Corp.

—o—

B. R. Stratton has been placed in charge of a new branch office recently established at Tulsa, Okla., by Cutler-Hammer Inc. Mr. Stratton will manage the new office as a branch of the Dallas district office.

—o—

G. O. Britton has been appointed domestic sales manager, and **E. B. Schlenk,** district representative of Athey Products Corp., maker of heavy road building equipment, Chicago. Mr. Britton became associated with the company last May as assistant domestic sales manager. Mr. Schlenk will take over the central territory.

—o—

Howard M. Dawson has been elected president, Jessop Steel International Corp., New York. He formerly was vice president and managing director of the corporation, a subsidiary of Jessop Steel Co., Washington, Pa.

—o—

Porter-Cable Machine Co., Syracuse, N. Y., announces appointment of **John A. Proven** as general sales manager. He previously held the position of vice president and sales manager of the Sterling Tool Products Co., Chicago. Mr. Proven will have charge of sales policies governing the national distribution of Porter-Cable's products which include portable electric tools, floor sanding machines, and abrasive belt grinders. He will also direct the sales efforts of the Unit Electric Tool Co., Syracuse, a division of Porter-Cable.

—o—

Dr. William W. Eaton has been appointed to the Central Research Organization of Olin Industries Inc., East Alton, Ill., parent company of Western Cartridge Co. Division and Winchester Repeating Arms Division. Dr. Eaton will have headquarters at New Haven, Conn. Besides the principal function of exploring new fields for possible future products, the Central Research Organization is devoted to making basic research and studies in the field of scientific development.

—o—

A. L. Berlin has been elected vice president in charge of sales, Pyle-National Co., Chicago. **W. A. Wulle** has been named advertising and sales promotion manager, and **F. M. Currie,** manager of industrial sales for this railroad equipment firm.

—o—

John T. Anderson, manager, commercial research department, Market Development Division, Armco Steel

This prescription raised production 50%

Vitamin "C"?—Carboloy Cemented Carbide, of course.

It was a Carboloy engineer who turned the trick. Here's the story:

On installing a new boring machine recently, a small plant in Pennsylvania was sadly disappointed to get no better production from it than they had from the old one. So they called in a Carboloy engineer.

Now? Thanks to his suggestions, the new machine is turning out half again as many pieces—twelve cast-iron wheels an hour instead of the previous eight.

Why was he able to help them? Here's the reason: Carboloy engineers spend most of their time working with Carboloy Cemented Carbides. They've come up against almost every type of carbide problem you can imagine, in their time. They're experts—specialists in carbides.

Try this prescription yourself!

You, too, can back up the intimate knowledge of your own production men with this specialized "know-how" of Carboloy engineers. They can bring to your plant a broad experience in obtaining maximum results with carbides.

Slight changes in tool design, speeds or feeds, grinding, or tool handling often effect far reaching economies and increases in out-put.

Together, your engineers and our Carboloy specialists can form a team nothing can stop. Together they can use carbides to cure many of your production ills.

Ask for your Carboloy engineer

Your Carboloy engineer will be glad to help you with your carbide problems; or in the selection of the most economical tooling from any of Carboloy's 600 standard tools and blanks, or special Carboloy-tipped tools made by more than 150 tool manufacturers.

Why not call your Carboloy engineer? Or write us direct: Carboloy Company, Inc., 11141 E. 8 Mile Road., Detroit 32, Michigan.

AUTHORIZED CARBOLOY CEMENTED CARBIDE DISTRIBUTORS

Standards stocked by authorized distributors in 82 cities coast to coast.

CARBOLOY®
CEMENTED CARBIDE

Corp., Middletown, O., has been appointed chairman of a project committee by the Census Advisory Board, U. S. Department of Commerce.

—o—

Hyman Iserson and **Maurice E. Miville** have been appointed research chemists at the Whitemarsh Research Laboratories, Pennsylvania Salt Mfg. Co., Philadelphia.

—o—

Representatives appointed by Allis-Chalmers Mfg. Co., Milwaukee, to district offices are: **J. I. Onarheim** and **R. T. Ward,** assigned to the Milwaukee district office. Mr. Onarheim, who has had more than 20 years of design and sales engineering experience in the company's electrical department, has been a member of the central station and marine sales department for the last 18 months. Mr. Ward, for the last four years in the administrative office of **W. C. Johnson,** executive vice president, General Machinery Division, was previously connected with the company's Washington office. **Jay Seefeld** has been named to the San Antonio, Tex., office. He had been with Tennessee Eastman Corp., Oak Ridge. **W. H. Sanford** has been assigned to the Houston, Tex., office. He previously was associated with Fort Worth Steel & Machinery Co. **A. Joseph Mestier Jr.** has been assigned to the New York district office as petroleum sales representative. He joined Allis-Chalmers in 1946 following discharge from the U. S. Army. **Robert E. Bender** has been assigned to the Grand Rapids office.

—o—

Orville F. Figley has been appointed Chicago district manager of United States Steel Supply Co., warehouse subsidiary of United States Steel Corp. Associated with the company for over 30 years, Mr. Figley has served exclusively as sales manager for the Chicago district for the past two years. Named as assistant district managers are **Frederick L. Bruckner** and **Arthur W. Johnson. Howard Heiser** has been appointed office manager. The appointments are concurrent with the recent move of the company's national headquarters to 208 S. LaSalle St. The warehouse and plant at 1319 Wabansia is now a separate district operation.

—o—

General Electric Co., Schenectady, N. Y., announces appointment of **Dr. James R. Donnalley** as manager of its silicone manufacturing plant at Waterford, N. Y., which is connected with its Chemicals Division. **Herbert M. Brusman** has been appointed manager of the Employee Relations Division of the chemical department, Pittsfield, Mass.

—o—

E. C. Schmidt will retire Dec. 1 as executive assistant to the president of Union Pacific Railroad.

—o—

Carl Eversole has joined the agency staff of Charles F. Dowd Inc., Toledo, O. He has been in charge of Industrial Division, advertising and publicity, at Surface Combustion Corp. for the past seven years. He will continue to handle the heat treat, steel mill, glass and Kathabar Air Conditioning Divisions of this account, now with Charles F. Dowd.

—o—

G. E. Seavoy, now vice president in charge of the Process Sales Division, will direct all field sales operations, including advertising, field erection and service for Whiting Corp., Harvey, Ill. **M. J. Rice,** now vice president in charge of the Industrial Sales Division, will direct all of the company's Product Sales Divisions. These promotions are the first step in a program to streamline and strengthen the company's sales organization.

—o—

Russell D. Ryker has been promoted to assistant manager, quality control, and **Louis J. Burkhart,** chief inspector, for Bendix Home Appliances Inc., South Bend, Ind. Mr. Ryker has been in the Quality Control Division since 1943. Mr. Burkhart formerly was with the Ingersoll Steel Division, Borg-Warner Corp.

—o—

Joseph W. Chanda has joined the International Division, A. O. Smith Corp., Milwaukee, and will specialize in the sale of electric motors.

—o—

Fred S. Ehrman, general sales manager of Bowser Inc., Ft. Wayne, Ind., since 1944, has been elected to the newly created post of vice president and director of sales. He has been associated with the company since 1925, and has served successively in experimental engineering, sales engineering and divisional sales work.

—o—

James C. Plunkett has been appointed assistant advertising manager for the Columbia Chemical Division of Pittsburgh Plate Glass Co., Pittsburgh. Prior to his appointment with Columbia Chemical Division, Mr. Plunkett edited *Electrical Merchandising News*, dealer publication of the residential sales department, Duquesne Light Co., Pittsburgh.

—o—

Joseph P. McManus, for 23 years associated with the Truck & Coach Division, Pontiac, Mich., General Motors Corp., and lately as assistant director of purchasing, has been named director of purchasing, succeeding the late **R. E. Hoppes.**

—o—

Thomas B. Moule, formerly assistant director of sales, has been appointed sales manager of Plomb Tool Co., Los Angeles. He has supervised many sales and merchandising activities since joining the company in 1944. For five years following graduation

ORVILLE F. FIGLEY

G. E. SEAVOY

THOMAS B. MOULE

Superfast in the air...

but what about production?

An outstanding example of Bliss' pioneering in equipment for the aircraft industry is the patented 2500-ton Six Die Slide Press used by many aircraft builders to produce a variety of sheet metal parts. Dozens of dies are kept in constant operation, as 24 operators simply load and unload. Interlocked control of any slide sequence is provided. No master operator needed.

Planning for planes? Or for any giant production job? Then Bliss engineers can help. They'll dare to pioneer with you in designing power press equipment specially suited for the job at hand. They bring to every conference table a fund of *production* engineering knowledge that goes back over 90 years. They've designed and built more types and sizes of presses than any other company in the world.

Yes, if it's airplane wings or jet tail cones, gage parts or landing gear, Bliss is particularly qualified to bring to your pressed metal problem the development engineering experience that's needed to get the most out of production. That's why Bliss presses predominate throughout the pressed metal field, the aircraft, automotive, railroad, electrical, and many other industries... that's why the biggest presses for the toughest jobs have always been Bliss-built...that's why if yours is a tough one, you'll be on your way toward solving it by sending for a Bliss engineer today.

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WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Englewood, N. J.; Derby, England; St. Ouen sur Seine, France.

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BLISS BUILT

See our Catalog in SWEETS

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY IN THE WORLD

from the University of Michigan, he was advertising and sales promotion manager for Ex-Cell-O Corp., Detroit, and for three years he was sales manager of the Republic and the Northern Aircraft Products Divisions of Avco Mfg. Corp.

—o—

Harry T. Worthington, vice president, Moore Division, Joliet, Ill., of Conlon-Moore Corp., Chicago, is chairman of the sponsors' committee and a member of the executive committee of the Gas Space Heater Division, Institute of Cooking & Heating Appliance Manufacturers, which will hold its 16th annual convention in Cincinnati, Dec. 6-8. The sponsors' committee represents manufacturers cooperating with the Battelle Memorial Institute and Bituminous Coal Research Inc., in a long-term study of coal heating appliances.

—o—

Norman J. Kilmer has been appointed sales representative for Ohio Electric lifting magnets in the Pittsburgh and Wheeling, W. Va., area. His offices are located in the Frick Bldg., Pittsburgh. He represents Ohio Electric Mfg. Co., Cleveland.

—o—

Dr. Marcus Thau has been appointed director of research, development and production, Metric Lacquer Mfg. Co. Inc., Irvington, N. J. He held a similar position with Lacquer & Chemical Corp., Brooklyn, N. Y.

—o—

Dr. Kenneth C. D. Hickman, inventor of the modern molecular still used for refining heat-sensitive oils, such as those containing vitamins, has announced that he will serve both Eastman Kodak Co., Rochester, N. Y., and Arthur D. Little Inc., Cambridge, Mass., as a consultant.

—o—

Walter H. Lessmann and **Roy R. Stamm** have been appointed assistant managers of the St. Louis branch, National Lead Co. Mr. Lessmann served the company in St. Louis for many years, and became assistant manager of the Cincinnati branch in 1940. Mr. Stamm began his association with the company in 1913. He served in the St. Louis metal department since 1924, where he has been manager since 1943.

—o—

William A. Finkl, president, A. Finkl & Sons, manufacturer of forgings, Chicago, has been named to the Illinois Institute of Technology board of trustees.

—o—

Frank C. Gerhart has been appointed advertising manager of American Type Founders Sales Corp., Elizabeth, N. J., effective Dec. 1. He will fill the vacancy left by the recent death of **Robert B. Huddleston.** For the past 12 years Mr. Gerhart has been with the Champion Paper & Fibre Co., Hamilton, O.

GORDON P. LOVELL

—o—

International Business Machines Corp., New York, announces appointment of **Gordon P. Lovell** as sales manager of its Electric Accounting Machine Division. He previously was assistant to the IBM general sales manager. Mr. Lovell joined the corporation in 1932, and has since served in various sales and executive capacities.

—o—

Louis L. Brott has been appointed public relations director for Institute of Scrap Iron & Steel Inc., Washington.

—o—

Louis Goldman, J. S. Goldman Iron & Metal Co., Port Huron, Mich., has been elected honorary vice president, a new office, of Michigan Chapter, Institute of Scrap Iron & Steel Inc. **Hyman R. Nathan,** Gendelman & Nathan Iron & Metal Co., Detroit, was re-elected president; **Edward Elk,** Kasle Bros. Inc., Flint, Mich., first vice president; **Joseph Newman,** Warren Iron & Metal Co., Detroit, second vice president; **Robert Glick,** Glick Iron & Metal Co., Jackson, Mich., secretary; and **Kenneth McClellan,** Luria Steel & Trading Corp., treasurer.

—o—

Northern Ohio Chapter, Institute of Scrap Iron & Steel Inc., has re-elected all officers with the exception of **Monroe Zipp,** who has been replaced by **Myron J. Urdang,** A. Shaw Co., Cleveland, as secretary.

—o—

Bruce H. Wallace, a vice president, Otis Elevator Co., New York, has been elected to the additional posts of treasurer and director. **Percy L. Douglas,** also a vice president, has been elected a director of the company. Mr. Wallace has been in charge of accounts and budgets, and chairman of the engineering development committee, while Mr. Douglas has been in charge of international operations.

—o—

T. J. Morton Jr., president, Hoosier Cardinal Corp., was elected president of the National Metal Trades Association. Other officers included **J. L. Kopf,** president, Jabez Burns & Sons Inc., who is the new first vice president; and **Philip M. Morgan,** president, Morgan Construction Co., the second vice president and treasurer.

—o—

Philadelphia Chapter, Institute of Scrap Iron & Steel Inc., announces the election of the following officers: President, **Harry Stave,** Stave Bros., Philadelphia; vice president, **J. F. Malloy,** Malloy & Schreiner, Philadelphia; treasurer, **D. J. Giordana,** Giordano Waste Material Co., Camden, N. J., and secretary, **Marcus J. Margulies,** Luria Steel & Trading Corp., Philadelphia.

—o—

Thomas C. Yarnell has been named manager of the Detroit district of Replacement Tire Sales Division, B. F. Goodrich Co., Akron. He succeeds **E. A. Holsten,** resigned.

—o—

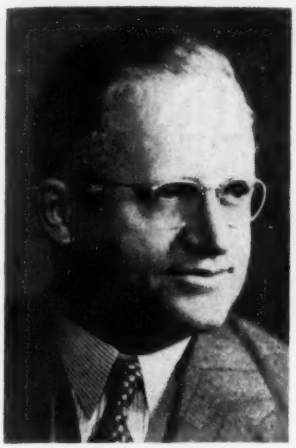
John S. Cort Jr. has been appointed assistant to the president of Martin Dennis Co. of Newark and Kearny, N. J., a subsidiary of Diamond Alkali Co., Cleveland. Associated since early 1947 with the Cincinnati plant operated by Diamond's Standard Silicate Division, Mr. Cort succeeds **Charles E. Grant,** who was promoted recently to manager of chromium chemical sales for Diamond Alkali at Cleveland.

—o—

Morris Rhine has been appointed assistant to the Pacific district manager, apparatus department, General Electric Co.

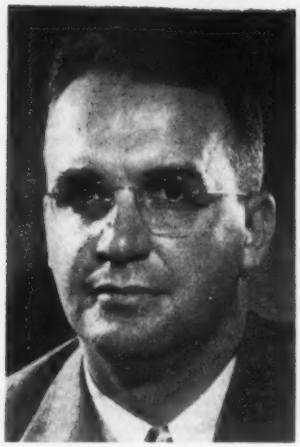
—o—

Belmont Iron Works, Philadelphia, announces the following appointments, to be effective Dec. 1. To serve until the next annual meeting of the shareholders of the company, **Robert E. Seiffert** succeeds the late **William C. Smith,** and **William E. Hendricks** succeeds **John S. Adelhelm,** resigned, on the board of directors. On the executive committee, **Harry A. Rowbotham** succeeds Mr. Smith and **Harold Leonberger** succeeds Mr. Adelhelm. In the finance committee **Bennett T. Mial** succeeds Mr. Smith and **Albert W. Schede** succeeds Mr. Adelhelm. **Sigmund S. Albert** succeeds Mr. Adelhelm as chairman of



WILLIAM L. DEAN

President and general manager, Mathews Conveyer Co., has been elected president, Foundry Equipment Manufacturers Assn. Noted in STEEL, Nov. 15 issue, p. 88



R. R. GRINER

Who has been appointed western sales agent at Kansas City, Mo., for Electric Furnace Co., Salem, O. Noted in STEEL, Nov. 15 issue, p. 88

E. E. BRADBERRY

Who has been appointed assistant manager of sales at Chicago, Jessop Steel Co., Washington, Pa. Noted in STEEL, Nov. 15 issue, p. 84

the executive committee. Vacancies filled in corporate offices are: **Albert W. Schede,** secretary, becomes treasurer, succeeding Mr. Adelhelm in that position. **Bennett T. Mial** succeeds Mr. Smith as vice president, and **Harry A. Rowbotham** succeeds Mr. Adelhelm. **Harold Leonberger** has been elected a new vice president. Administrative vacancies filled are: **Harry H. Stahl,** formerly assistant chief engineer, becomes chief engineer, succeeding **Joseph G. Shryock; Robert K. Seiffert** becomes assistant chief engineer: and **William Hendricks** will be production manager of the company.

—o—

Melvin W. Cole, who has served as director of the Iron & Steel Division, Office of Industry Co-operation, since that unit was set up under Public Law 395, terminated this connection as of Nov. 12. He is succeeded in this capacity by **A. A. Wagner,** on loan from Jones & Laughlin Steel Corp. Mr. Cole has resumed on a full-time basis his connection as assistant general manager, western sales, Bethlehem Steel Co., with headquarters in Detroit. Mr. Wagner had served as assistant to Mr. Cole in the OIC.

OBITUARIES . . .

Myrl L. Jacobs, 63, vice president in charge of raw material properties, Bethlehem Steel Co., Bethlehem, Pa., died Nov. 13 in Trinidad, B. W. I., where he was on a tour of company properties. He joined Bethlehem Steel in 1920 as general manager of quarries and 14 years later was appointed general manager of the Stone & Slag Division. In 1939 he was named assistant to the vice president and in the following year was appointed vice president, in charge of all Bethlehem subsidiary companies engaged in mining. He was also elected a director of Bethlehem Steel Corp. that year.

—o—

George G. Small, 84, long associated with the United Engineering & Foundry Co., Pittsburgh, died Nov. 15 at his home in Beaver, Pa. He was made second vice president of the company in 1905, and 10 years later, first vice president. He retired in 1930 after 36 years with the company and its predecessor.

—o—

Heyliger Church, 55, vice president in charge of export sales, Weatherhead Co., Cleveland, died of a heart attack Nov. 13, while on a business trip in Buenos Aires. He joined the Weatherhead Co. in 1936 as sales manager, Aviation Division.

—o—

Thomas R. Mullen Jr., vice president, Lehigh Structural Steel Co., Allentown, Pa., died in Salem, Mass., Nov. 16, as a result of injuries received in an automobile accident a few days before. He was affiliated with the New York office of the company and was a son of the president of the company.

—o—

James D. Jones, 67, vice president in charge of engineering, H. A. Brassert & Co., New York, consultant engineer to the iron and steel industry, died recently. In 1905 he was appointed chief engineer for Algoma Steel Corp., which he left in 1911 to become chief engineer of Gary Works, Carnegie-Illinois Steel Corp. He returned to Algoma Steel to become vice president in charge of engineering from 1918 to 1935. He joined Youngstown Sheet & Tube Co. in 1935 as chief engineer for all of its plants, and in 1945 joined H. A. Brassert & Co.

—o—

Joseph A. Kilpatrick, 80, chairman of the board of Dominion Wheel & Foundries Ltd., Toronto, died recently. He was connected with Griffin Car Wheel Works, which later became Canada Iron Foundries. Mr. Kilpatrick also served as director of Canada Iron Foundries Ltd., Reading Car Wheel Co. Inc., National Iron Corp. Ltd., and Anglo-Canadian Wire Rope Co. Ltd.

—o—

Robert M. Akin, 71, chairman, Hudson Wire Co., Ossining, N. Y., died recently. From 1908 until a month prior to his death he had been president of the company.

—o—

Nelson E. Woolman, 63, mechanical engineer, Cherry Rivet Co., Los Angeles, and former owner of Power Seal Co., died recently.

—o—

Frederick K. Weider, president, Medina Iron & Brass Co., Medina, N. Y., and president of Barr & Creelman Plumbing Supply Co., Rochester, N. Y., died Nov. 13.

—o—

Charles E. Wicke, 58, president, A. C. Wicke Mfg. Co., New York, maker of industrial refrigeration equipment, died Nov. 10 at his home in Yonkers.

—o—

Andrew J. Ronan, 71, proprietor of A. J. Ronan Co., maker of truck bodies, Albany, N. Y., died recently.

FLASH BUTT-WELDED
STAINLESS STEEL RINGS
by AMERICAN WELDING

Compared with any other manufacturing method, flash butt-welded alloy rings prove to be equally efficient and much less expensive. Records show that there is a substantial

SAVING IN THE PRICE OF RINGS
SAVING IN THE COST OF TOOLING

when alloy rings are produced by the flash-butt welding process.

If you use stainless rings, or any other welded product, a few moments spent with our representative may prove to be very advantageous. May we hear from you?

Send
...for 16-page
Illustrated Booklet

REPRESENTATIVE FLASH BUTT-WELD TEST RESULTS (as welded) FROM AMERICAN WELDING AND MANUFACTURING COMPANY'S RESEARCH FILES.

ALLOY	TENSILE STRENGTH
Stainless, Type No. 347	91,000 psi.
Stainless, Type No. 410	76,000 psi.
Inconel-X	124,000 psi.
N-155	135,000 psi.

THE AMERICAN WELDING AND MANUFACTURING COMPANY
110 DIETZ ROAD • WARREN, OHIO

Engineering News . . . AT A GLANCE

CHIP DUMPING FIXTURE— In processing large V-8 cylinder blocks in Ford's Lincoln plant, an unusual setup is employed to free them of loose chips. The company uses an automatic roll-over fixture immediately following the rough boring station. Each block is pushed into the fixture, automatically rotated to dump out the loose chips, then automatically moved to the next operation.

BEARING PROTECTOR— Dirt and moisture are excluded from the precision ball bearings shipped by Barden Corp., Danbury, Conn., by means of a polyethylene film supplied by Plax Corp. of Hartford, Conn. The plastic covering is reported to afford both a physically and chemically tough protective wrap. It does not become brittle even at temperatures as low as 60° below zero, nor does it lose stability when subjected to high humidity or temperatures found in the tropics. Further advantage is its resistance to the oil used to keep the bearings lubricated.

CUSTOM-BUILT FITTINGS— Flat steel plate was used by Akweld Construction Co., Brooklyn, N. Y., in making up some fittings required by Kings County Lighting Co., for a natural gas line running into its new compressor plant. Sections of the plate first were cut from 4-inch and 5/16-inch thick stock with an Air Reduction No. 10 radiagraph oxyacetylene machine, then rolled into shape. Butt joints were welded from both sides and flanges were welded both inside and outside. The fittings ranged in diameter from 8 to 50 inches.

SPEEDS UP FORGING— Use of a mechanical positioner or manipulator in the forge shop of Marion Power Shovel Co., Marion, O., now enables a 3-man crew to hammer out large shafts in a matter of 15 minutes—one-fourth the time required formerly by the old method which occupied a 6-man crew. The unit takes the square billets from the ovens and positions them in preparation for a series of blows by the steam hammer—an operation that transforms the billets into round shafts. During the time necessary for hammering, the heated shafting does not drop below 1800° F.

ROCKS ON ROLLERS— Some 13,888 rollers, each made up of three tube-shaped steel pulleys are included in the 7-mile conveyor which recently began the job of transporting 4 million tons of crushed rock for the construction of the giant Bull Shoals dam on White river. According to Hewitt-Robins Inc., Passaic, N. J., the machinery it supplied for the project supports 21 separate belts for handling materials at the rate of 525 feet per minute.

DELICATE POSITIONING— In handling delicate parts of x-ray tubes in the plant of General Electric X-Ray Corp., Milwaukee, gloves are worn by operators at all times in one operation—that of setting coiled filaments into cathode cups to a prescribed depth below the surface of the cups. Positioning must be accurate to within plus or minus one-thousandth of an inch. The cathode may be compared in importance with the lens of a camera. Its accuracy must be microscopic, since output of the tube is dependent on the size and shape of the focal spot from which the electrons emanate before bombarding the target or anode to produce x-ray.

DESIGNER'S HEADACHE—Whenever a surface on a forging must be machined, it is highly important to increase dimensions of the part to allow enough metal for an effective job of machining. Amount of metal to be allowed on such parts is a question for the designer to answer. From the machining viewpoint, allowance should be as little as possible to cut down machining time. Yet if amount of metal allowed on the part is too small, too much time may be used in positioning the forging in the machine, inasmuch as it is important to center the forging exactly. (p. 68)

"SINTER-WELDING" PROCESS — In producing parts of metal powders by compression, each part is transformed into a strong piece by subjecting it to a heat treating or sintering process that welds the individual powder particles together. Often, it is pointed out, a metal-to-metal contact does not exist in the unsintered compacts, since the particles may be separated by thin oxide films. This structure is fundamentally changed by sintering in a controlled reducing atmosphere. Metallic bonds are produced in a short time, at temperatures usually below melting point of the metals. (p. 73)

UNEXPECTED ELIMINATED—Unexpected shutdowns of furnaces caused by failure of some hidden or inaccessible part of a furnace are eliminated by suspended type construction in open hearths, it is found. This construction is stated to make it possible to schedule furnace repairs with a much higher degree of accuracy, the campaign life of a furnace being regulated by roof life. Furthermore, it eliminates danger of failure of furnace sections caused by difference in expansion rates between old and new silica brickwork. (p. 91)

INSPECTION PLUS—During the manufacture of hollow steel aircraft propellers in the plant of Curtiss-Wright, inspectors "comb" over every operation to insure precision workmanship. Several times during each blade's manufacture x-ray photos are made of the entire blade. As many as ten to twelve 13 x 17-inch negatives are needed to cover one blade. Nothing is left to chance—each operation, of necessity, must be perfect. Defects that cannot be remedied lead to scrapping the blade. (p. 100)

Part XIII of the current forging series

Fundamentals of Forging Practice

Continuing his discussion of factors affecting forging design, the author reviews design characteristics of forging machine and press forgings, heat treating considerations, amount of metal to be allowed for subsequent machining operations

By WALDEMAR NAUJOKS

DESIGN of impression die forgings to be made on the forging machine has some problems similar to those in the design for drop forgings. Consideration must be given to thin sections, narrow ribs, and other factors that tend to promote quick cooling on portions of the forging. However, the forging machine does not have the draft requirements of the drop forging, and most of the parts that are adapted for forging machine work can be produced without draft.

The forging machine develops flow of metal by upsetting or gathering metal and spreading it out to make the shape of the forging. Symmetrical round shapes such as gear blanks, pinion blanks, flanges, hubs, bolt heads and other similar shapes are well adapted for production in the forging machine, within limits of capacity. Many of the parts mentioned may contain a straight hole for the shaft, and in most instances, the holes can be included in the design of the forging. Since pushing the header tool against the end of the bar tends to upset and spread the forging stock, parts with deep pockets, such as socket wrenches, can be made to close tolerances.

Irregular shapes, such as clevises and yoke ends, can be made on the forging machine. Similarly, bolts with flat T heads, trunnions and other irregular shapes are products of the forging machine.

Forgings made by the forging machine generally have surfaces that are comparable to those obtained as a drop forging. It may be more difficult to keep the scale from the die impression on the forging machine than on the drop hammer where long sections with deep holes are being forged. However, good scale blowing devices generally solve the problem. Where heating is done electrically by induction heating, the scale problem is eliminated for practical purposes. Deep holes, such has holes in steel forged shells, can be designed without draft. Figs. 81 and 82 illustrate typical designs for forgings made on the forging machine.

Fig. 81—Cluster gear forging

Fig. 82—Pinion rack for power shovel

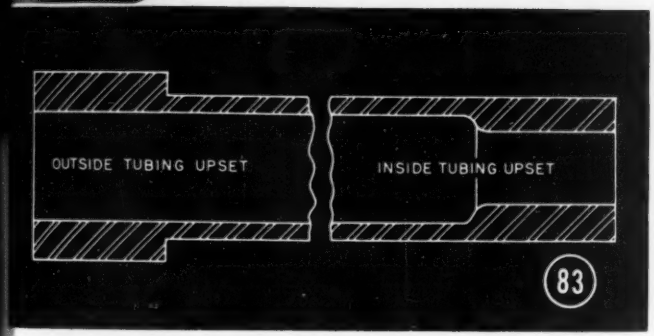
Fig. 83—Outside (left) and inside (right) tubing upsets

Tubing can be upset to advantage in the forging machine. For outside upsetting, where the inside diameter remains constant and the metal is added to the outside diameter, the size and thickness of the upset portion of the tube forging can be held to normal tolerances by the die pocket provided. For inside upsets, where the outside diameter of the tubing remains constant and where the extra wall thickness is added to the inside diameter, it is difficult to control the length of the inside upset except by length of heating, since die shoulders cannot be provided. Special furnaces for control of the length of heating, or induction heating, are used generally for tubing upsets. Fig. 83 illustrates tubing upsets made on the forging machine.

Press Forging Design—Design for impression die press forgings must consider two general groups

of forgings: (1) Brass and bronze forgings and (2) steel forgings in the various steel alloys. Press forgings in brasses and bronzes have been made and used for several decades while the use of the forging press on steel forgings developed more recently, and with the building of the modern powerful and rigid forging presses.

Forgings in most of the available brass compositions can be designed to almost any shape desired. The brass forging composition is capable of being extruded as well as being flowed, and this permits



the making of shapes that are not practical in the harder compositions such as steel. Bronzes can be extruded to a lesser degree than brass because they are somewhat stronger. The draft requirements on brasses and most bronzes are very small. Draft angles from 3 degrees to no draft are common as against the normal 7 degrees for drop forgings. Thin ribs and high bosses can be made without undue difficulty in brass and bronze. Fillets and radii can also be smaller than on drop forgings.

Where pockets and bosses are included in the brass and bronze forging, it is desirable to use fairly good radii if the design permits, using a minimum of about 1/16-inch radius on brass press forgings up to about 20 pounds. Much greater freedom in design is permitted on brass and bronze press forgings than is desirable on similar parts in steel as drop forgings.

Press forgings in carbon and alloy structural steel cover a large variety of shapes. The forging press is especially adapted to symmetrical forgings such as gear blanks, pinion blanks, disks, cups and similar shapes. Most of the symmetrical shapes can be made in the forging press with lesser amount of draft than on the drop hammer. Ejecting devices, usually termed "kickers" can be used with mechanical type of forging press for pushing out the forging from the bottom die, particularly where the forging has a fairly large or rigid center hub. Where the kicker can be used, lesser draft, or none at all, is specified. Fig. 84 illustrates typical forging press designs. Shapes that are not symmetrical may be produced in the forging press by making the forgings in pairs to obtain the required balance. It is also possible to prepare suitable blanks for the forging press by use of preshaped bar stock, by hammer equipment for preshaping, or by preshaping on the forging machine.

Machining Allowance — The forging, in most instances, is subjected to one or more machining operations. These are used to shape certain sections of the forging so that the part will have the proper shape, fit and tolerances at the points of machining. Some forgings, such as a drop forged bucket tooth for use on a clamshell digging bucket, usually require no machining beyond drilling several holes in the bucket tooth so that the tooth can be bolted to the bucket. Some impression die forgings require machining on one surface so that the machined surface can be fitted more closely or more exactly to another metal member.

Drop forgings such as connecting rods require several machining and grinding operations to obtain the close fitting tolerances necessary on the part to enable it to serve its purpose in the motor. Wherever a surface on a forging must be machined, it is necessary to increase dimensions to allow for metal removal by machining. The amount of metal to be allowed for machining is a question for the designer to answer. From the machining viewpoint, the allowance should be little as possible, since machining time tends to increase with more metal to be taken off.

However, if the amount of metal allowed for machining is too small, too much time may be used in putting the forging into the machine for the machine work because the forging must be centered more exactly. The designer must then allow enough metal for machining so that the setup time in putting the forging in the machine is not excessive and the allowance is not so much that it causes excessive machining time.

Much depends upon the type and age of the machine to be used. Modern, heavy duty machines that are built today are designed for fast heavy machining. A little extra finish on the forging is not too important. On the older and slower machines

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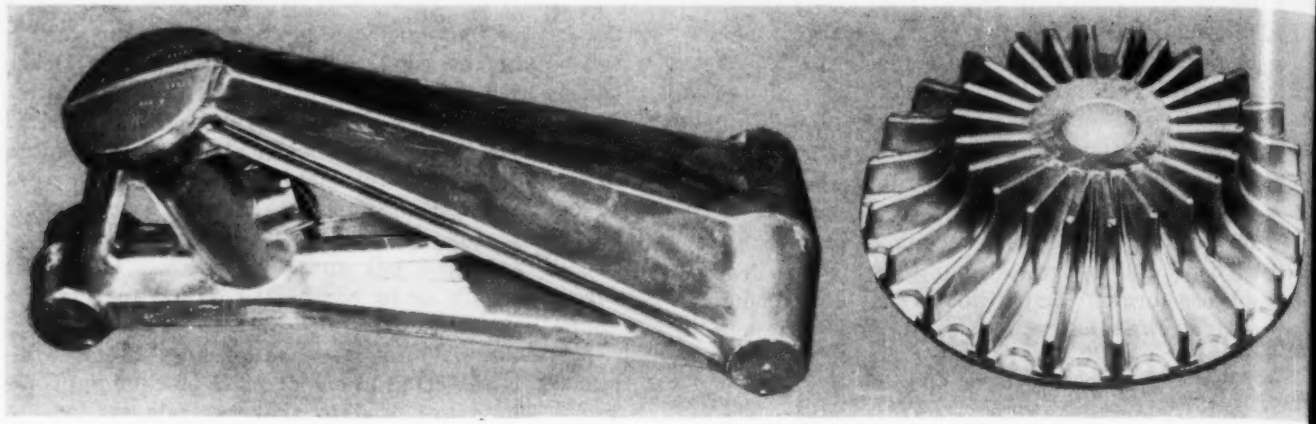


a small amount of excess metal to be machined may entail more of a problem. Generally considered, it has been found that in most cases a bit of extra allowance for machining is more to be desired than with a skimpy machining allowance. There are several points to be considered in determining the allowance for machining on forgings made with impression dies.

Exact Duplication Impossible—It is known from information and data given previously that it is not possible to make impression die forgings that are exact duplicates of each other. The variations may be slight, perhaps only a few thousandths of an inch on some special forgings but more normally the tolerances range from 1/64 to ¼-inch for large forgings. Even with die impressions exactly to size, there will be some changing of size due to die wear. Other factors that tend to prevent impression die forgings from being exact duplicates are a difference in temperature of one forging from another at the final blow or machine pass, because of a slight die shift and because each piece of forging stock is not placed in the die impression in exactly the same place or in exactly the same manner.

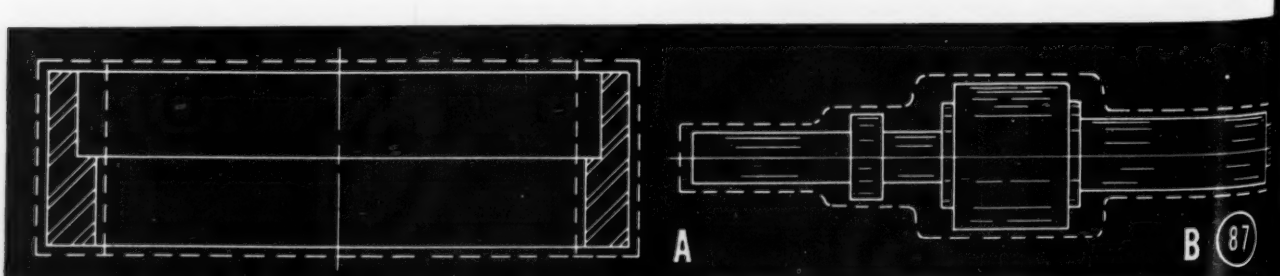
Another point in considering the amount of allowance for finish is the condition of the forgings themselves. Some forgings may contain scale pits (previously described in inspection) and scale pits may be 1/64-inch deep on small impression die forgings and can be up to ⅛-inch deep on large impression die forgings. Forgings with considerable length in proportion to their cross-section area may contain a small amount of warp. Handling forgings to precise exactness in all phases of operations so that the impression die forgings are exact with each other is the ideal goal, never quite attained in commercial practice. This makes it important to consider all conditions in determining the amount of allowance for machining.

Allowance Increased for Complicated Operations—It has been found that small and medium-sized impression die forgings which require normal machining operations such as turning and milling should have an allowance of 1/32 to 1/16-inch on all surfaces for machining operation. This allowance should be increased for the more complicated machining operation where it is necessary to be certain that good clean metal is reached. Where a surface is being machined to remove surface decarburization, 1/16-inch is usually allowed on small and medium sized impression die forgings. In other words, 1/16-inch of surface must be removed. Figs. 85 and 86 show forged parts before and after machining.

On larger impression die forgings, those normally weighing over 100 pounds, the allowance for machining on each surface should be increased to about ⅛-inch for each surface. When the impression die forging gets up over 500 pounds, ¼-inch is usually desired for each surface to be machined. On many of the large forgings, it is necessary to study the individual design to determine the various conditions which may affect the machining allowance requirements. Warp, for example, may be more difficult to remove in a very large forging than in a small one. Draft, scale, shrinkage and possible die shift are other points of consideration.

Weldless Forged Rings—Allowance for machining on smith or hand forgings is greater than on impression die forgings because smith or hand forgings are made without the use of die impressions. Smith or hand forgings have a greater variation from one forging to another forging of same part. Smith forging

Fig. 87—Allowance for machining on smith forgings. Broken lines indicate machining allowance on smith forged ring (A) and on smith shaft forging (B)



U-W U-W Vogt DROP FORGED W W

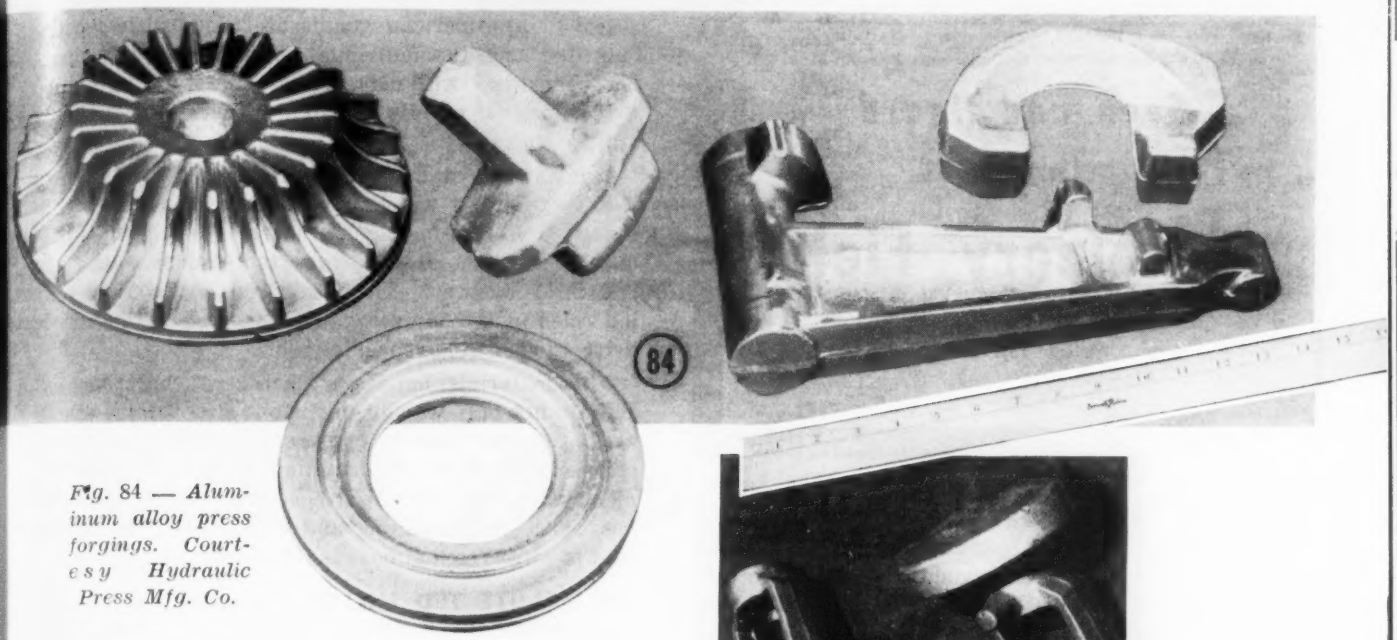


Fig. 84 — Aluminum alloy press forgings. Courtesy Hydraulic Press Mfg. Co.

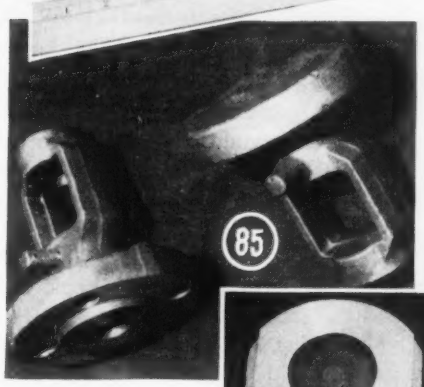


Fig. 85 — Valve bonnet forgings before and after machining Courtesy Ohio Injector Co.

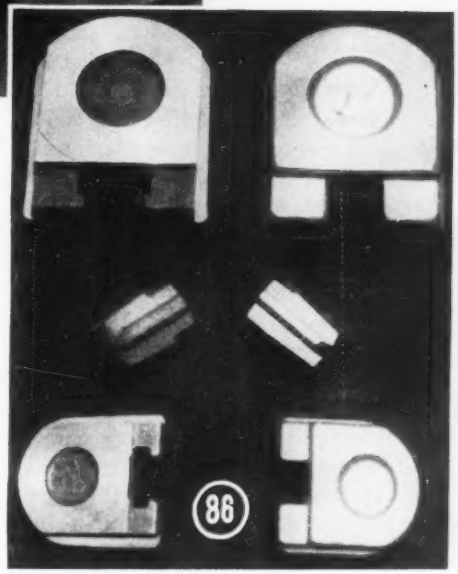


Fig. 86 — Gate valve wedge forgings before and after machining. Courtesy Ohio Injector Co.

such as weldless forged rings have a normal machining allowance of ⅛-inch for each surface to be machined, on rings up to about 8 inches in diameter. Or stated another way, outside diameter is increased by ¼-inch, inside diameter is decreased by ¼-inch, and the width or face of the ring is increased by ¼-inch. Fig. 87 shows the application of machining allowance on a typical weldless ring forging and on a forged shaft.

On weldless rolled rings over 8-inches outside diameter and up to about 18-inches outside diameter, the allowance for each machined surface is 3/16-inch, which increases outside diameter by ⅜-inch, decreases inside diameter by ⅜-inch, and increases width of face by ⅜-inch. On weldless rolled rings over 18-inch outside diameter the machining allowance on all machined surfaces is ¼-inch, which increases the outside diameter by ½-inch, decreases inside diameter by ½-inch, and increases the width or face by ½-inch. For weldless rolled rings over 36 inches outside diameter, a greatest allowance must be used.

Smith forgings on parts such as gear blanks, hub blanks, stems, bars, shafts, and similar parts usually require at least ⅛-inch machining allowance on all machined surfaces for the small and medium small forgings. As the forging becomes larger, the machining allowance is increased. Forgings weighing about 100 pounds usually have ¼-inch machining allowance for each surface to be machined. Where parts are subjected to warpage due to long length, it is desirious usually to provide ample allowance for machining.

Pockets and similar depressions worked into the smith forging must have greater than normal smith allowance for machining because it is not practical to try to locate the pocket to close exactness. For a rough general rule, the smith forging should have at least twice the machining allowance that is given to the impression die forging.

Heat Treating Considerations—Heat treating the forging before any machining operations, has become more prevalent in recent years, due in part to the newer steels which permit machining at higher hardnesses and to the modern machines which are capable of machining the tougher heat treated steels. Naturally, the designer is faced with the problem of specifying the point of heat treatment; no general rule can be given. It is possible to indicate the advantages of heat treating first, along with the disadvantages and to list the advantages of machining first and then heat treating along with the disadvantages. Usually a consideration of all the factors will enable a procedure to be selected.

Forgings machined before they are heat treated to the specified hardness or toughness, are usually machined in the normalized or annealed state. Normalized or annealed forgings usually machine with considerably greater ease (*Please turn to Page* 110)

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

"IN-PLANT" TRANSPORTATION: Until recently techniques of materials handling on a nation-wide scale had developed far beyond those for getting things to the right place at the right time within the factories and machine shops of America. In other words, in this land of magnificent distances, the history of waterway, highway, railway and airway transportation makes up a much bigger book than does that of "in-plant" transportation.

Those of us who attended the Second Materials Handling Machinery Manufacturers Conference sponsored recently by Westinghouse Electric Corp. at Buffalo were impressed, however, by the rapid strides now being made in the mechanization and co-ordination of what might be called "inside transportation" of materials, parts and finished products in American industrial plants.

This rapid progress is due in part to the fact that more and more industrial plants involve magnificent distances within their own walls, in part to the fact that current wage scales preclude the use of men as burden-bearers, and in part to the fact that only through mechanization can materials handling be made to keep pace with production machinery.

It was emphasized that materials handling represents the largest item in manufacturing cost today in the production metalworking industry. Many instances were cited where—through installation of the latest machine tools—machining costs have been cut to what appears to be an irreducible minimum. The only way to attain greater efficiency is to get the material into these machines faster and more conveniently, and get the finished work (and likewise the chips) out of the machines faster and easier.

Inasmuch as this sort of thing tends to make a production shop in effect "one big machine", the need for standardization of materials handling units becomes apparent. In this respect the builders of materials handling equipment today find themselves in very much the same position as the builders of railway equipment found themselves about 80 years ago—when short lines began to be linked into transcontinental systems.

The master car builders association got busy on that problem and it was not long before railway equipment was standardized from coast to coast—making the American railroads the envy of the world. If history repeats itself, American industrial co-operation and American genius at standardizing without hindering the individual initiative of participating companies will make it possible for "in plant" transportation rapidly to catch up with long distance transportation.

Many of the standardization problems involved are similar to those which have been ironed out within recent years through conferences between the automotive industry, the machine tool industry and the electrical industry. Electrical drive and control play big roles in mechanized handling—just as they do in drive and control of machine tools.

The materials handling machinery conference at Buffalo not only was an important step toward standardization but also it emphasized that manufacture and sale of materials handling machinery hold tremendous possibilities for those who go at this business with understanding and with vigor. Obviously, that is why Westinghouse is interested.

WE SALUTE TED MILLER: Everyone in the gear and machine tool industries knows E. W. (Ted) Miller of the Fellows Gear Shaper Co. Many know him as "the sage of Vermont", a title which he earned through years of public service with organizations such as the American Gear Manufacturers Association, of which he was president from 1932 to 1934.

Few will believe me, however, when I say that on Friday, Nov. 5, 1948, Ted Miller rounded out 50 years of service with the company. The day following he became president of the company upon retirement from that office of E. J. Fullam, now chairman of the board.

Ted Miller is one of four noted machine tool men who came to Springfield, Vt., in the late years of the 19th Century from the Torrington, Conn., district. The other three were the late James Hartness, who became president of Jones & Lamson Machine Co., and one-time governor of Vermont; George O. Gridley, inventor of the Gridley automatic screw machines, one-time vice president of the Windsor Machine Co., which was bought out by National Acme Co. of Cleveland, and one of the founders of the New Britain-Gridley Division of New Britain Machine Co.; and the late E. R. Fellows, inventor of the Fellows gear shaper around which the company of that name has been built up.

To my way of thinking, one of Ted Miller's finest characteristics is his loyalty to the memory of E. R. Fellows. I agree heartily with Ted Miller's conviction that E. R. Fellows—who was a most unassuming gentleman—actually was one of America's outstanding geniuses in the design and construction of high production, precision machine tools. I hope one day to be able to join forces with Ted Miller in writing a biography of Mr. Fellows.

At the same time, I take this opportunity again to emphasize that Ted Miller is a noted machine tool man in his own right. In the long journey from lathe hand to president, he has served as chief engineer, general manager, vice president and director, he has been granted nearly 80 patents, and he has been awarded an honorary degree in mechanical engineering by Stevens Institute of Technology. Ted Miller certainly rates a salute!

Current Trends in Powder Metallurgy

By WALTER F. TOERGE
Associate Editor, STEEL

After a period of rather spectacular development, the processes of making things from metal powders are now established as economically effective, especially in producing parts of porous, high melting point, "nonalloying" metals and combinations of metals and nonmetals

CONTINUED expansion and improvement of the art of making things from powdered metals and other materials is reflected both product and equipmentwise as powder metallurgy techniques take their place in the mass production scene. Major progress has been in combining procedures and in designing parts, recognizing the possibilities and limitations of the various production steps.

As is true of every other metalworking technique, the processes of fabricating parts from powders have some distinct advantages, among which are: Speed and economy of production, uniformity, purity of metal content, variety of properties, ability to combine metals and nonmetals which cannot be alloyed in any other way, reduction or elimination of machining and consequently of scrap loss by maintenance of fairly close dimensional tolerances. It is often possible to briquette and sinter a piece to the finished size to tolerances of plus or minus 0.001-inch. Some products, such as tungsten for light bulb filaments and electrical contacts, self-lubricating porous metal bearings and clutch facings cannot be fabricated economically by any other method.

Conversely, powder metallurgy's practical, competitive scope is limited by die cost and press capacities to quantity production of relatively small parts. Certain restrictive rules must be observed in design of the parts because powdered metal does not flow like molten metal. Physical properties are not so good as they are in wrought or cast materials, although they are sufficient for many purposes. Raw materials cost more per pound than solid metals.

Mixing—Production of a powder metallurgy part

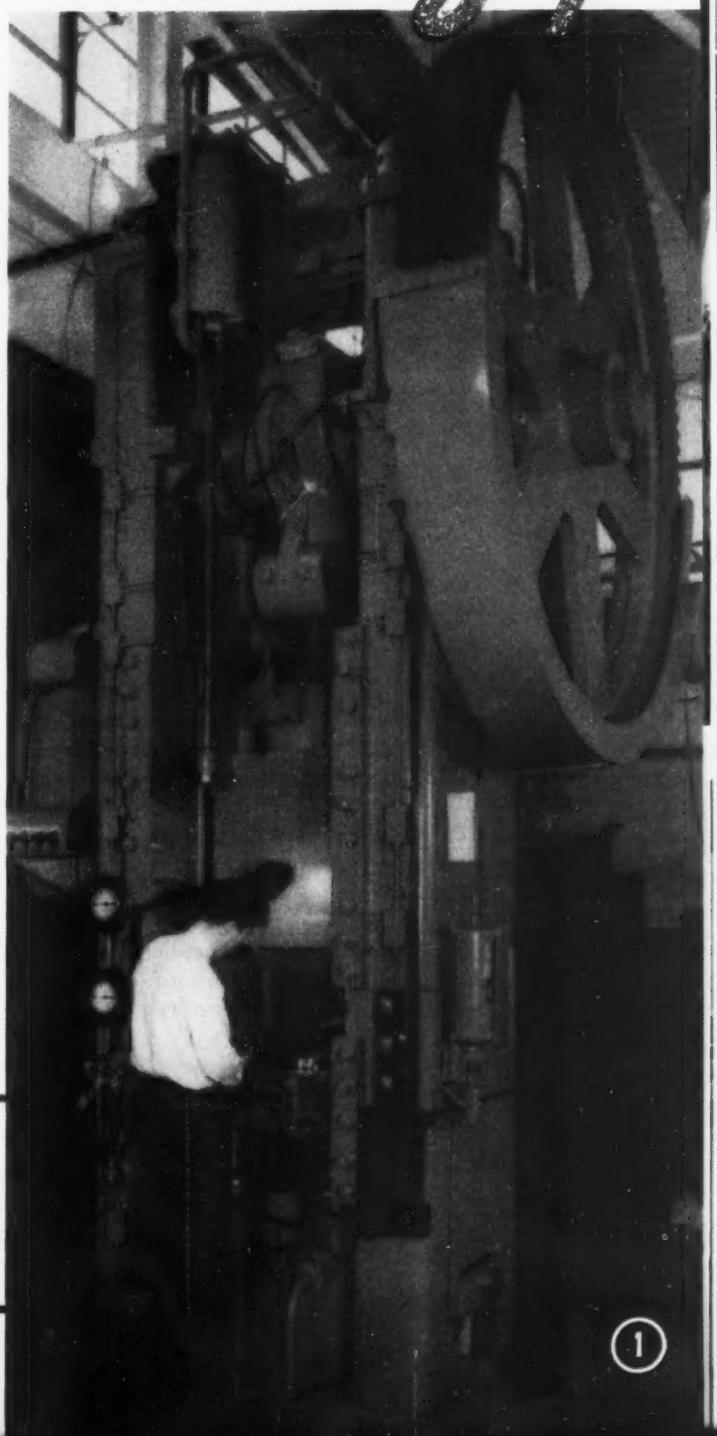
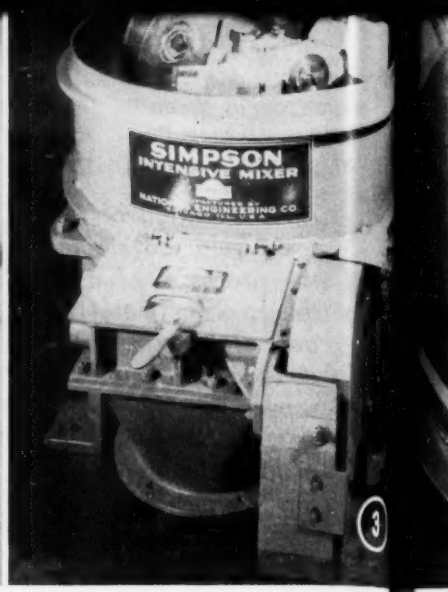


Fig. 1—Complex powder metal parts of large irregular cross-sections can be produced to close tolerances on this 345-ton briquetting press designed with a hydraulically-controlled floating die table and core rod rams. Courtesy E. W. Bliss Co.



Powder Metallurgy

commences with weighing, blending and mixing of the powders, if two or more materials are to be used. Constituents are blended to combine metals with different chemical or physical characteristics, or metals with nonmetals. Two different methods are used for mixing: (1) Dry blending of different metal powders to form a base stock of mixed materials, and (2) addition of binders and lubricants to individual batches.

Dry blending is usually done in large quantities, while paraffining or wet blending, is almost always resorted to in mixing small lots. In the latter, wax or binder of some type is dissolved in a volatile liquid, such as naphtha or carbon tetrachloride. This solution is added to the dry powder in a mixer to produce a thin paste. As the mixing progresses, the volatile ingredients pass off, leaving a dry powder. In some cases, heat is desirable in speeding up removal of the volatile substance.

In applications where continuous porosity is required for lubrication or for filtering, openings between particles must be kept open. To do this, ammonium chloride or other volatile solid ingredients are mixed with the powder before pressing and then evaporated before or during sintering, depending on furnace design.

Pressing—After mixing, the granular powders are ready to be formed into the shapes desired. This is done by compacting them in a die, under great pressures. Usual pressures are somewhere between 10 and 50 tons per square inch. The average is around 30 tons.

At the present time, most parts are formed cold, but hot pressing is receiving considerable attention experimentally. The idea of hot pressing is to apply heat at the die, thereby eliminating the subsequent sintering step. For ferrous metals, temperatures range from 1100 to 2000° F and for nonferrous, from 200 to 900° F. One advantage of hot pressing methods is that of working with considerably lower pressures than in cold pressing. Hot pressing offers a means of producing dense, complex-shaped parts, but mold materials having high strength at high temperatures are not fully developed. Another major difficulty arises in protecting the part from oxidation during pressing.

In room-temperature pressing, compacting pressures and speeds depend upon the size and shape of the part being produced, as well as density desired. Both mechanical and hydraulic, and combination mechanical-hydraulic presses are used, with cold compressing performed on either moderate speed single punch or on high speed rotary multiple punch units, most of which are equipped to feed powder, compress and eject the "green" compact automatically. Production on high speed rotary presses, using multiple sets of dies, can reach as high as 1000 pieces per minute. Contrary to the usual conception of powder pressing speeds, one theory holds that slow compression is not so effective as a quick stroke. A fast powerful stroke is said to impart greater uniformity in the briquetted part. To permit escape of trapped air a brief dwell under pressure is sometimes required.

Press Design—Basic problems in press and die design are to secure proper density and density distribution in the compressed piece and at the same time to meet accuracy requirements. Proper die fill must be provided and sufficient pressures furnished. Present trend of the industry seems to point toward machines with greater pressures and more intricate movements to produce parts of complex shapes.

Powder is usually introduced into the die cavity volumetrically from a hopper. In order to obtain uniform density and dimensions in powdered metal parts, it is necessary to fill the die cavity with a uniform fill of powder. Density of the compact exercises profound effect upon the mechanical and electrical properties of the finished part. Other factors in the briquetting process are speed of compression, stroke and pressure control. For complicated parts, elaborate combinations of multiple punches are utilized. General practice, however, is to compress from the top and bottom, with suitable knockouts below.

Dies—Powder metallurgy dies are generally made of high carbon, high chromium steel, high speed steel

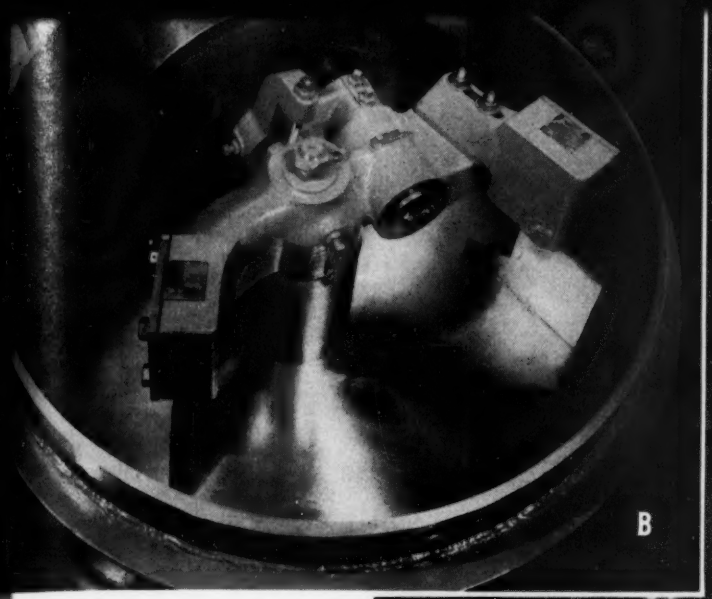


Fig. 2—Examples of parts made by powder metallurgy processes. Courtesy Kux Machine Co.

Fig. 3—(A) Mixer used for dry blending different metal powders to form a base stock of mixed material; This equpment is also used for the addition of binders and lubricants to individual batches. (B) Top view of same unit. Courtesy National Engineering Co.

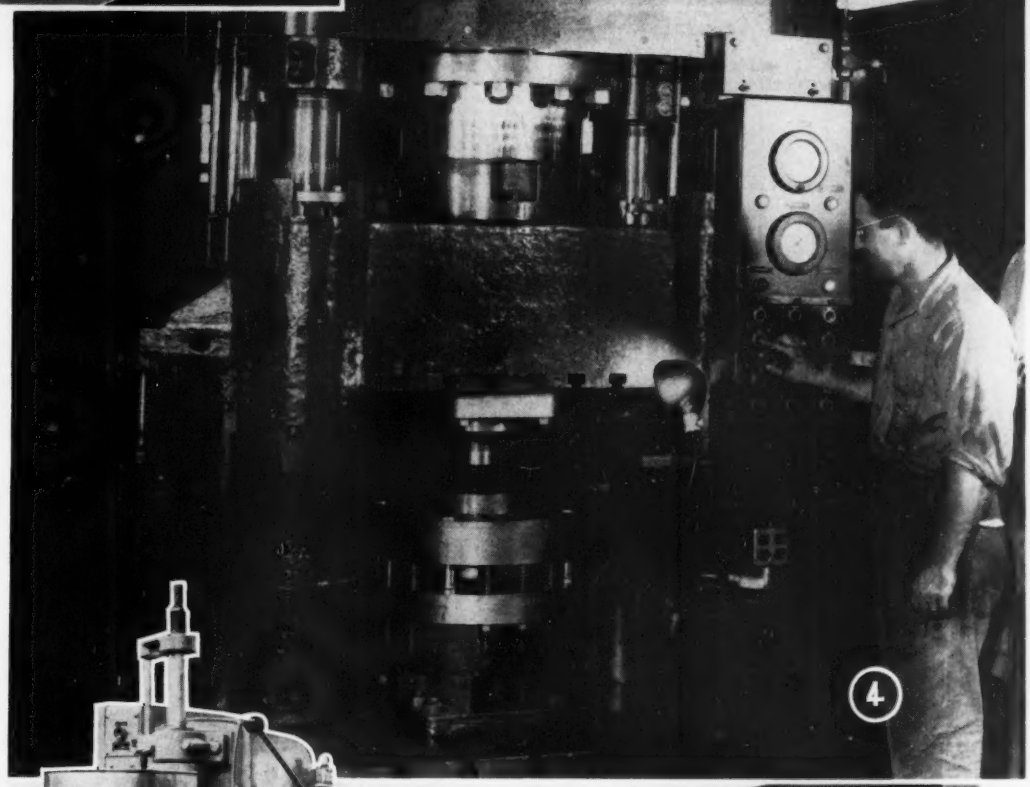


Fig. 4—Oil-hydraulic preforming and coining press. Repetitive and single automatic pressing strokes or manual control of each press movement can be obtained on this 500-ton unit. Courtesy Hydropress Inc.

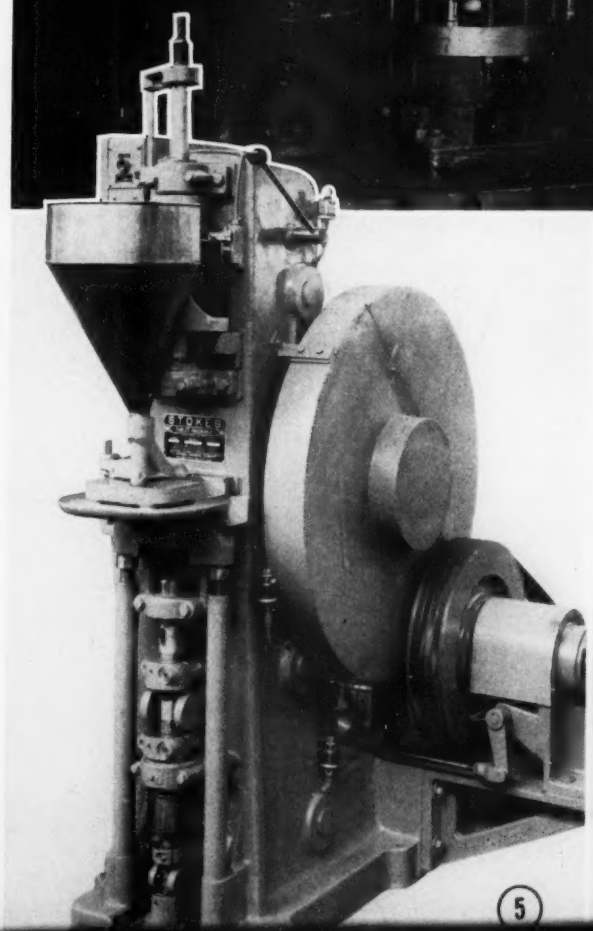
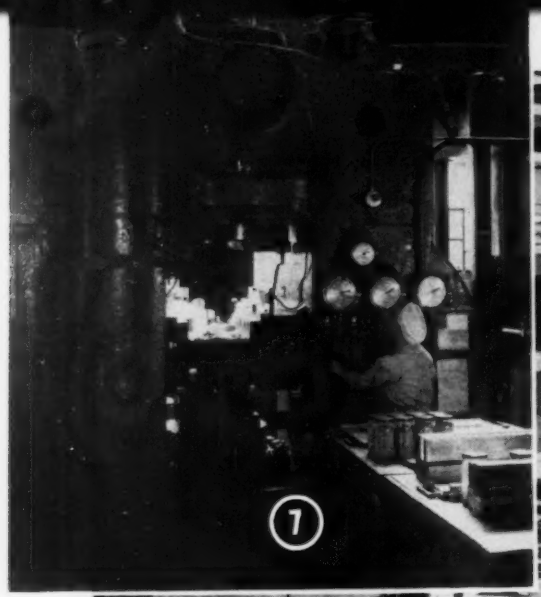


Fig. 5—This 12-ton capacity press is capable of applying pressures simultaneously from both top and bottom. Unit can be operated with a compound or secondary lower punch, adjustable stroke or pressure, by a simple cam change. Courtesy F. J. Stokes Machine Co.

Fig. 6—Maximum press tonnage is adjustable from 40 to 400 tons on this manually-controlled vertical-horizontal press. Pump and motor are mounted on top of the self-contained unit. Courtesy Watson-Stillman Co.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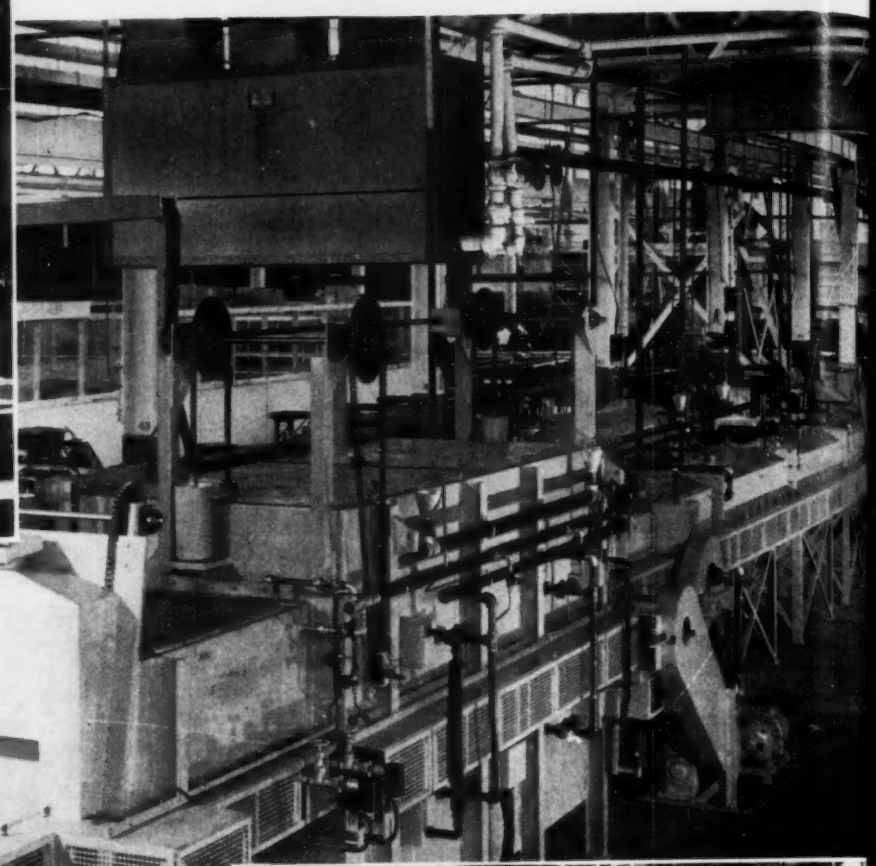

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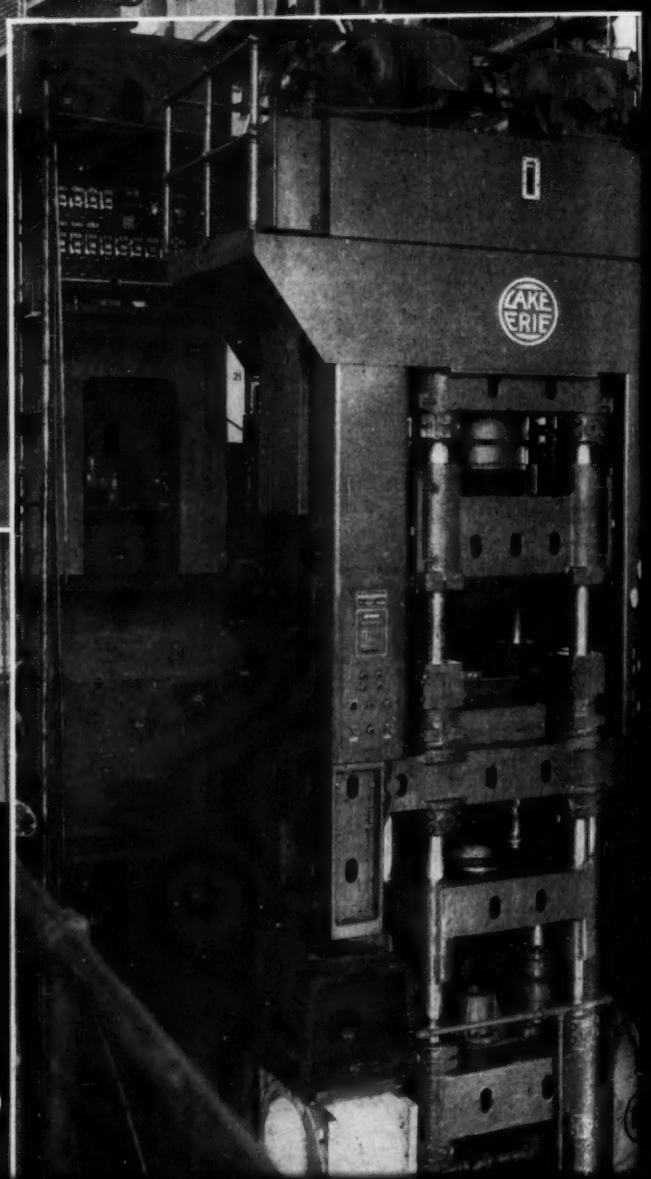
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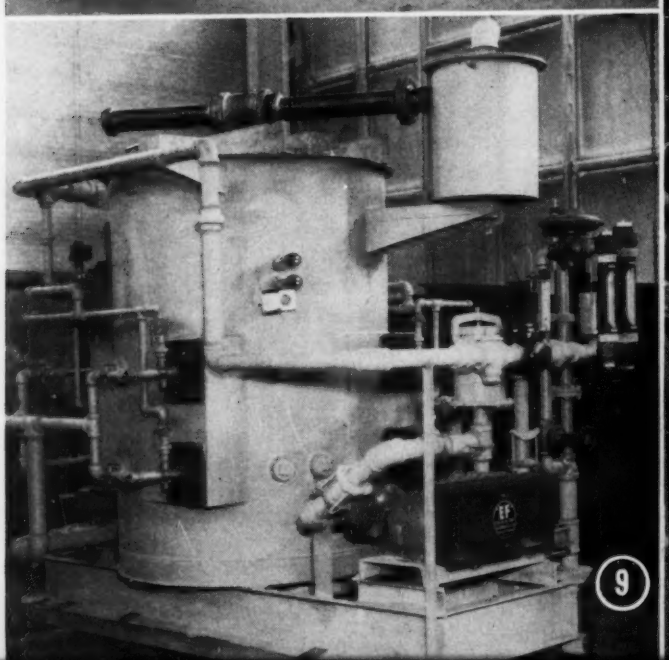
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or tungsten carbide, with as low a coefficient of friction as possible. Die wear, where press operations will permit, can be reduced by lubricating the die with graphite flakes, stearic acid, glycerin or other lubricants. The inside diameter should be ground and then lapped longitudinally because the resulting smoothness aids in ejecting the "preforms" or briquettes. Dies are usually machined with a small amount of relief (taper) to facilitate ejection.

Compression ratio is one of the factors controlling depth of the die. It may be defined as the ratio of the density of the compressed compact to that of the unpressed powder. In most cases the compression ratio is somewhere in the neighborhood of 3 to 1. Where extremely fine powders are used, it may be as high as 6 to 1 or even higher. This is not predictable, but varies greatly from powder to powder.

Fig. 7—Tantalum, tungsten and molybdenum metal powders are compacted under heavy pressures on this 3000-ton triple-action hydraulic press to form bars or ingots weighing up to 6000 grams. Courtesy Baldwin Locomotive Works

Fig. 8—Continuous roller hearth furnace for sintering ferrous and nonferrous pressed powder parts. Operating up to 2050° F, it uses an Endogas atmosphere. Work is carried through furnace on trays. Courtesy Westinghouse Electric Corp.

Fig. 9—Endothermic type gas cracking unit or generator which produces a gas rich in hydrogen and carbon monoxide. Courtesy The Electric Furnace Co.

Fig. 10—Four-column, self-contained hydraulic briquetting press equipped with top and bottom rams, bottom core and horizontal charger. Capacity is 260 tons on the top ram and 240 tons on the bottom. Courtesy Lake Erie Engineering Corp.

Fig. 11—Mesh belt conveyor furnace for sintering powdered metals in the presence of an externally-prepared atmosphere. Courtesy W. S. Rockwell Co.

Fig. 12—Hydrogen atmosphere furnace built for sintering powdered metal gears at 2150° F. Courtesy Charles A. Hones Inc.

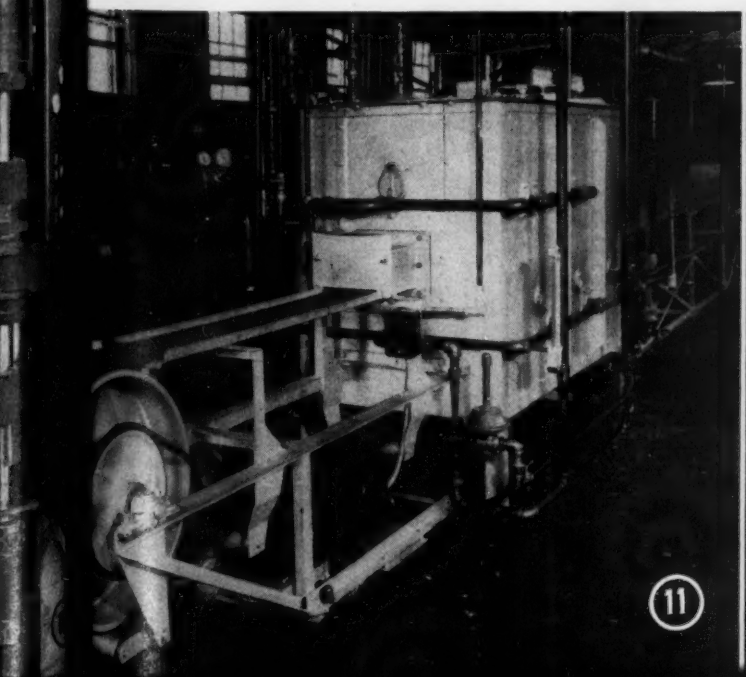
Powder Metallurgy

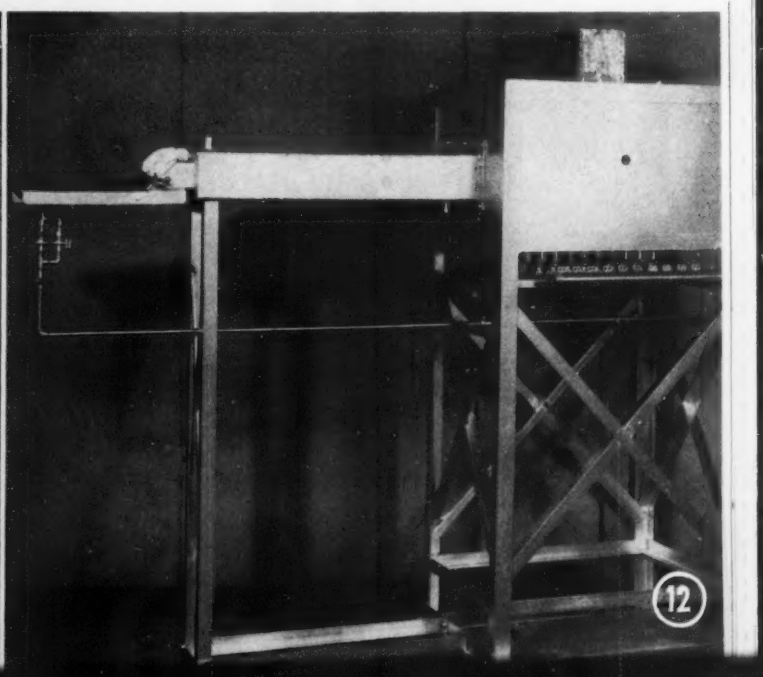
In designing dies for parts such as bushings, the relation between length and diameter must be taken into consideration; flat and thin parts demand great care to be sure the section is not too thin (not less than 0.032-inch). Large and abrupt thickness changes, uneven cross sections, narrow and deep splines, sharp corners, internal angles without fillets should be avoided. At present, certain structures cannot be pressed without presses capable of highly complex actions: Holes not parallel to the axis of compression, horizontal grooves and undercuts. Allowance must be made in die design for shrinkage in the subsequent sintering step.

Transformation to Finished Part—After the compressed part is ejected from the die cavity by action of the lower punch, it is heat treated or sintered to cause coalescence or welding of the individual powder particles, thus forming a strong piece. Often, a metal-to-metal contact does not exist in the unsintered compacts, since the particles may be separated by thin oxide films. This structure is fundamentally changed by sintering in a controlled reducing atmosphere. Real metallic bonds are produced in a short time and at temperatures usually below the melting point of the metals involved.

With the aid of an electron microscope, Charles Hardy Inc., New York, in co-operation with the RCA laboratories at Princeton, N. J., recently revealed that under proper sintering conditions particle boundaries are completely removed. Most production sintering work is done at greater than two-thirds of the melting point; in general, strength increases with temperature. To complicate sintering practice are such factors as growth or shrinkage of dimension (as high as 10 per cent), internal and external effects of gaseous reactions.

Controlled reducing atmospheres are usually employed for sintering. Choice of an atmosphere depends upon the powdered material, and upon the initial and operating cost of the gas generator. One





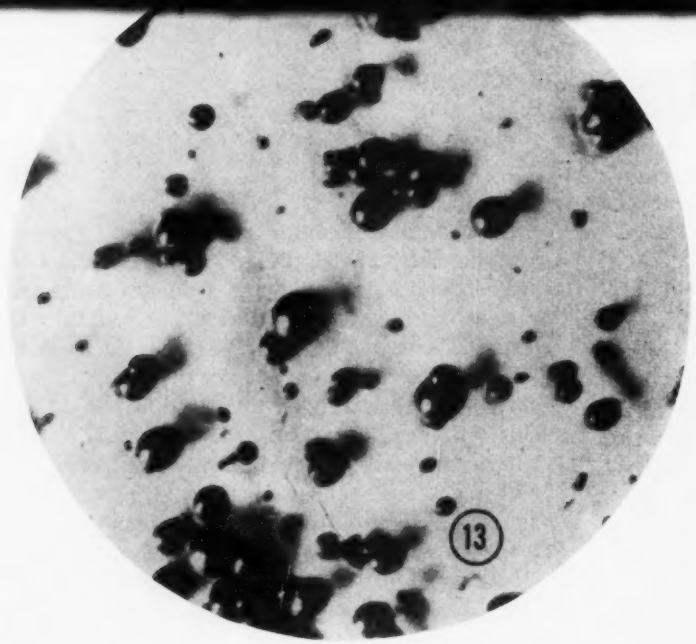


Fig. 13—Carbonyl iron powder at 750X. Courtesy Antara Div., General Aniline & Film Corp.

all-purpose sintering atmosphere is pure dry hydrogen. This atmosphere is used for Alnico, stainless steels or any alloy composed of an oxidizable metal and aluminum, or containing over 1 per cent chromium. Dissociated ammonia is a well known, high purity gas mixture. Iron and steel powders, brasses, bronzes, pure copper, tungsten and stainless steel are among the metals reported to be successfully sintered in dissociated ammonia. Combusted gas, resulting from the partial combustion of hydrocarbon fuel gases with air in atmosphere gas converters, is the most common gas used for sintering furnace atmospheres.

Two temperature ranges are used for sintering: One with a top temperature of 1700° F for copper base and low melting point alloys; iron base alloys take a high temperature of about 2100° F. Sintering furnaces are similar to brazing units, with preheating, high temperature and cooling zones, and some means of propelling the parts through, either hand pusher, mechanical pusher, or continuous belt.

Usually, in sintering pure metals and many combinations of metals, no melting takes place. When low melting point metals are mixed with high melting point materials, the former metal may be fused, as in the sintering of various hard carbide compositions.

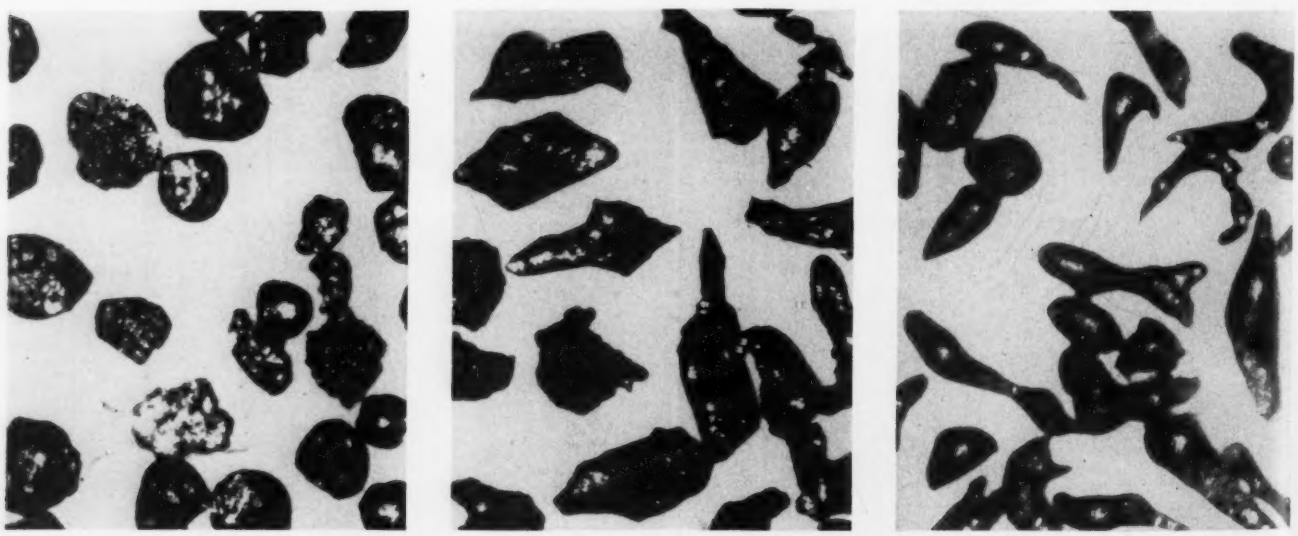
Where additional strength, extremely close tolerances (bronze and iron parts can be held to 0.0005-inch per inch perpendicular to the axis of compression) high physical properties or high surface finish are specified, it may be necessary to coin or size the sintered part. Sizing usually takes place on some special modification of the familiar punch press, or else fed back into the forming press.

Metals Used—The most widely used powder metallurgy metals and products fabricated from them present a surprisingly long list of familiar items. Refractory metals were among the first to be formed by powder metallurgy methods. Techniques originally developed for obtaining and processing tungsten powder are now applied to molybdenum, tantalum, columbium and to other high melting point metals. Wire, electrodes, electrical contacts, electronic controls are some of the products manufactured from these metals. Cemented carbides, for cutting tools, dies and other wear resistant products are powder metallurgy products. Self-lubricating bearings, metal filters, magnetic parts, clutch facings and brake linings can be made by the powder-press-sinter processes.

Porous metals and alloys having a controlled permeability can be prepared by mixing a porosity-producing substance, such as ammonium bicarbonate, with metal powder, and then pressing and sintering. Copper, nickel, iron, copper-zinc, copper-tin, iron-nickel, stainless steel and nickel-molybdenum-iron are some of the materials studied in connection with preparing porous materials.

Copper and tin powders produced to varied density and particle size are used principally in the manufacture of oilless bronze bearings and parts. Primary use of silver in powder metallurgy is in the production

Fig. 14—(A) Granular nickel, 160X, (B) irregular cupro-nickel, 40X, (C) elongated solder, 40X



A B C

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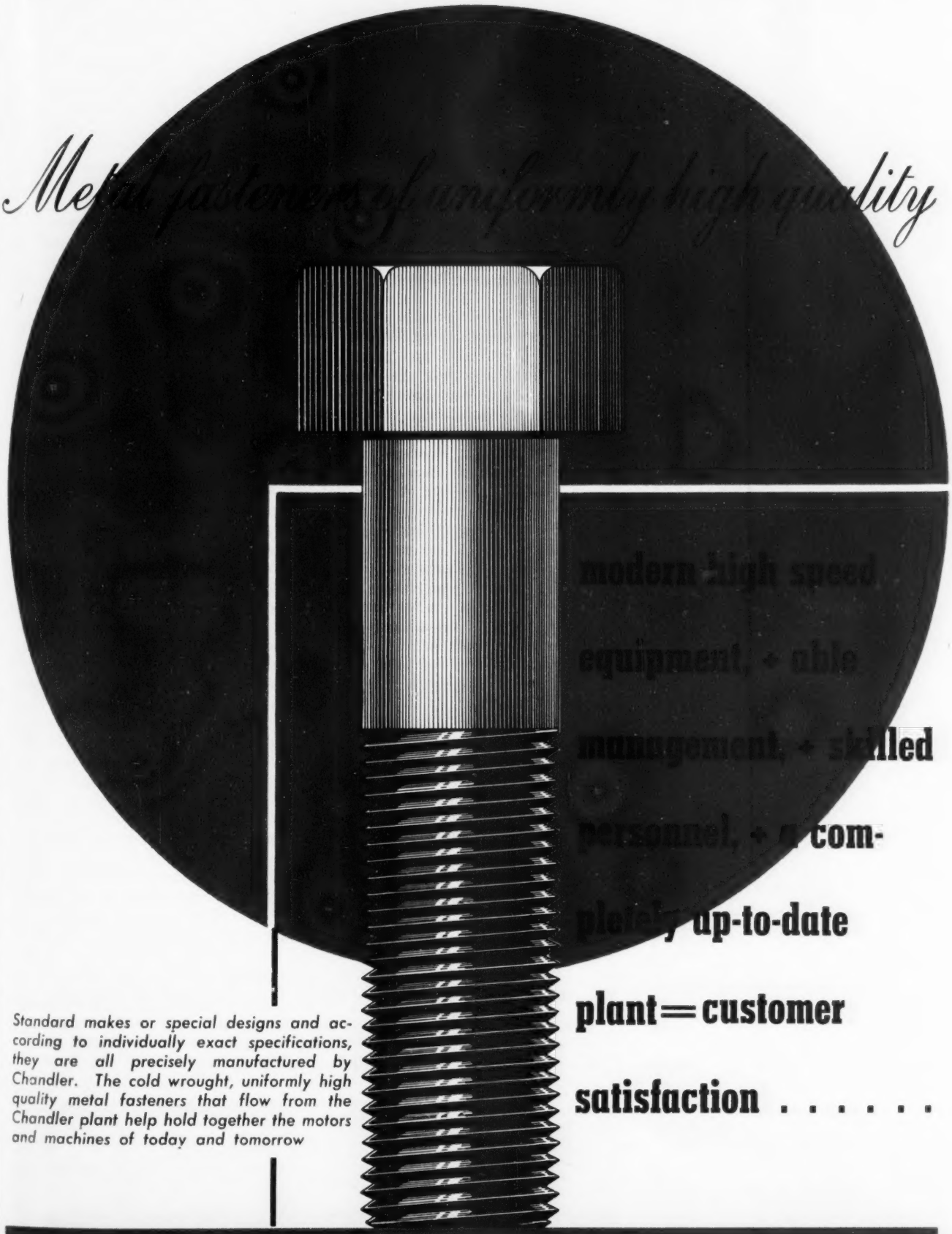

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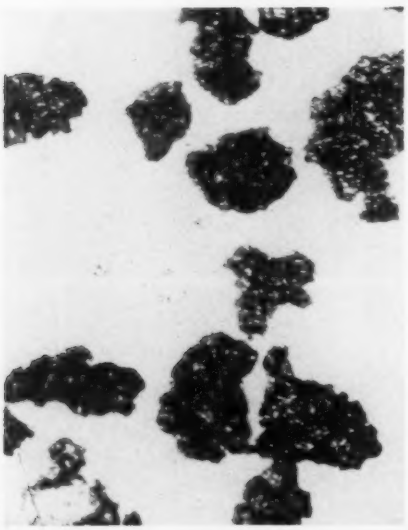

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of materials for the manufacture of electrical contacts. Combinations of silver with nickel, tungsten, molybdenum, iron, graphite and metal oxides are readily fabricated by powder metallurgy processes.

Metal-Ceramic Materials — While the combinations of metallic and nonmetallic materials such as the friction composition mentioned above, are well known, there are many more combinations of metal powders and ceramic materials. The relatively new field of metal-ceramics is being rather thoroughly explored. Current research is concerned with two different groups of composition: (1) Mixtures of metallic and ceramic powders; (2) combinations using different layers of metal and ceramic powders. Both mixtures and multilayer materials are developed to form high temperature-resistant compositions. Separately, mixtures are used to fabricate electrical semiconducting materials or electrical resistors; multilayer compositions can be developed for electrical products such as condensers. Results of studies presently being conducted are promising.

Some commercially important work has been done on combining iron powder with graphite to make plain carbon steel and in preparing nickel steels from elemental metal powders by powder metallurgy methods. Conclusions reached as a result of investigations on nickel steels point to the fact that diffusion of the alloying elements takes place sufficiently in the solid state to change the mechanical properties of the nickel steel as compared to the properties of plain carbon steel. Carbon content can be controlled to within 0.10 per cent.

Powder Quantities—This year, the Metal Powder Association estimates that nearly 30 million pounds of products will be manufactured by powder metallurgy processes. Products will range in weight from about 0.001-ounce to 100 pounds and in size from 0.001-square inch to approximately 20 inches in diameter. Copper, iron, lead, tin, aluminum, and alloy powders in that order will continue to be used in greatest quantity, but almost all commerically-significant metals will be represented along with certain ceramics and powdered glass. For example, copper alloy containing titanium with other elements was recently adapted to the process of making glass-to-glass and glass-to-metal seals. Accompanying table reflects prices of most-used metal powders.

As to quantity consumption of powdered metal products, the automotive and aircraft industries will probably lead, using thousands of gears, cams, bearings, friction materials, sleeves, bushings, rings, filters and many other smaller parts. Metals such as iron can be obtained with a wide range of properties. Each type is applied to parts where its peculiar properties are most adaptable.

One method of cooling jet engine parts in contact with high temperature gases extends the field of application of porous metals. The so-called "sweat cooling" principle consists of fabricating the part to be cooled of a porous material through which the cooling fluid can be forced. Temperature of the coolant moving in opposite direction to the heat flow gradually increases while passing through the porous material. On the heat-exposed surface, the coolant forms a protective layer. Very close control of permeability is required in this application, because a given rate of flow of coolant under certain conditions of pressure drop must be assured. One of the problems facing researchers is to develop porous alloys with maximum permeability and minimum porosity. Since tensile strength decreases with increasing porosity, the importance of solving this problem is quickly evident, where tensile strength is a significant factor in parts' design.

Variables to Be Controlled—To in-

(*Please turn to Page* 111)

Fig. 14 *(continued)—(D) dendritic silver,* 40*X, (E) porous copper,* 40*X, (F) nodular aluminum* 75*X, (G) machined magnesium,* 72*X, (H) plate nickel,* 75*X, (I) flake bronze,* 40*X*

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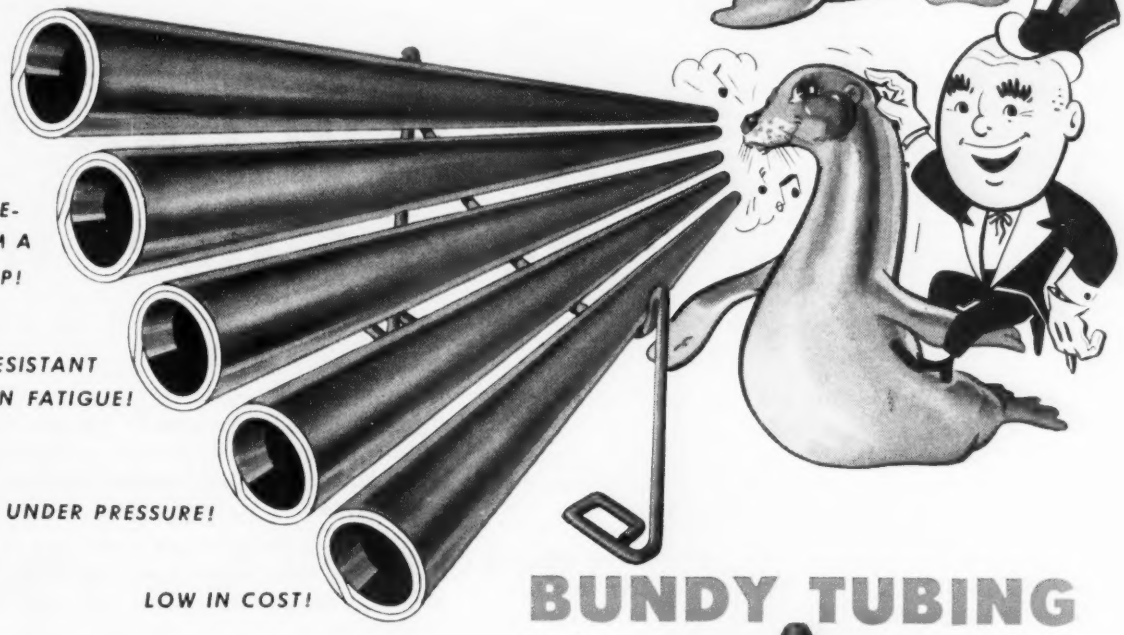
If you want to know more of the reasons Bundyweld is first choice with automotive manufacturers, ask your Bundy distributor or representative (listed at the foot of this page) for all the facts. Or call us: *Bundy Tubing Company, Detroit 14, Michigan.*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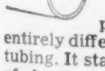

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2 This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.

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By using mill rolls made of Tungsten Carbide, a metal near diamond-hardness which takes and holds a high lustrous polish, a rich mirror-like strip finish is produced.

Where a soft temper is necessary, the mirror finished strip is then processed in CMP's exclusive bright annealing furnaces which anneal the strip while retaining the gleaming finish.

Available in many highly-corrosion-resistant chrome-nickel types and in gauges as thin as .001" this new CMP development offers many opportunities for cost reduction and product improvement.

At the same time, it makes the use of chrome-nickel stainless strip steel possible in many products where fabricating and finishing costs heretofore precluded its use. For example, some manufacturers have found that expensive polishing and buffing operations, always considered necessary, can now be reduced or entirely eliminated.

If you are using stainless steel strip in your product—or would like to—we would welcome an opportunity to show you how this improved Thinsteel will give it added usefulness, beauty and sales appeal with the possibility of important savings in production costs.

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- **GAUGES THIN AS .001"**
  ... strength with lightness

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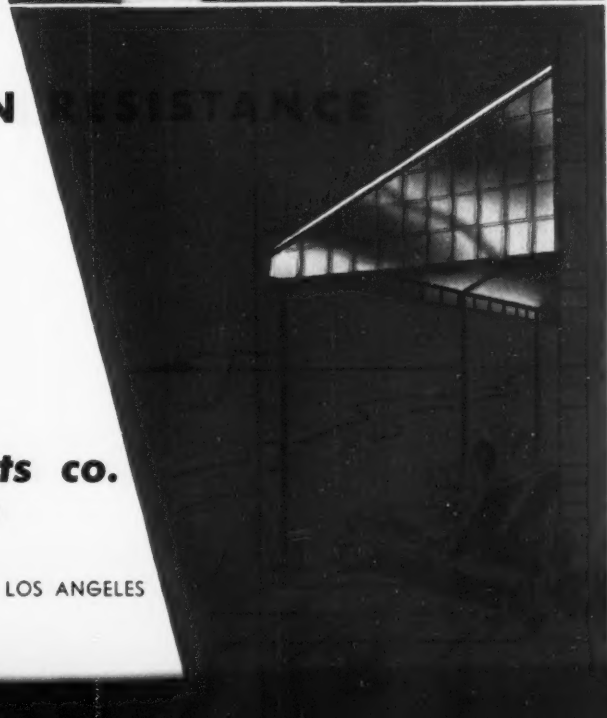

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IRVIN WORKS
Modernization Program

. . . effects improved product quality and processing efficiency

MODERNIZED facilities which make possible production of sheet steel in coil form up until the final operation of shearing to size have been installed at the Irvin Works of Carnegie-Illinois Steel Corp.

Major additions to existing sheet-steel producing facilities include: An additional slab-heating furnace for the 80-inch hot-strip mill; conveyors and shearing equipment with other auxiliaries added to the existing 80-inch pickling line; a new 56-inch continuous pickler; new shearing equipment in the finishing department; new sheet-coil annealing furnaces; handling units added to the temper mills; and pilers for cold-reduced sheet-shearing lines.

A new, fourth furnace has been added to the three that formerly supplied heated slabs to the 80-inch mill. It is a zone-controlled, triple-fired, end-charged, end-discharged, continuous-type furnace. Maximum capacity of the new unit is 105 tons per hour, when heating a double row of cold slabs, 6 to 8 inches thick and 8 feet, 10 inches long, to 2350° F. Design and control features make it possible to heat slabs from 3 to 8 inches thick and 20 to 60 inches wide, and from 60 to 216 inches long to uniform rolling temperature throughout.

New equipment for the 80-inch raw coil pickling line includes a cold water-spray rinse tank, hydrochloric acid dip tank, cold water-spray rinse tank and hot-water dip tank, looping pit, delivery pinch rolls, side trimmer with scrap chopper, inspection table, drag bridle, overhung mandrel-type coiler, driven pallet-type conveyor and scale. Support rolls, wringer rolls, tables, guides, fume-exhaust system, and other auxiliaries complete the installation. An existing dryer, entry pinch rolls and guides, unfolding rolls and upcut shear were completely rebuilt and relocated in the line.

The 56-inch raw coil pickling line is designed for continuous pickling and side trimming of hot rolled material 18 inches to 48 inches finished width and 0.050-inch to 0.250-inch thick.

Pickled product is delivered from the line in coils 20 inches to 31 inches in inside diameter, by 55 inches to 80 inches outside diameter, and weighing up to 42,000 pounds. The line normally operates with material 0.070 to 0.150-inch thick and is designed for most economical operation within this range. Welds that join successive coils to each other are sufficiently strong and free of upset after flash trimming to permit subsequent cold rolling at full mill speed.

Coil-feeding and welding equipment are designed for continuous operation of the pickling section at 230 to 420 feet per minute, depending upon strip width.

The pickling section includes 280 feet of active pickling length and is divided into four brick and rubber lined tanks, with acid-heating and fume-exhaust systems. The necessary equipment for rinsing and drying has been provided.

A continuous motor-driven chain-type conveyor, 575 feet long, transports hot-rolled steel coils weighing up to 20,000 pounds, on side or end, at floor level, from the raw coil storage building to the 80-inch pickle line. The conveyor has a capacity of approximately 100 coils, making a continuous total load of about 750 tons. Speed is 15 feet per minute, controlled by electrical equipment suitable for 30 start-stop operations per hour under full load.

Numerous major changes were made to the sheet annealing department in conjunction with the mod-

Fig. 1—Discharge end of slab reheating furnace battery. Unit in foreground is new furnace recently installed

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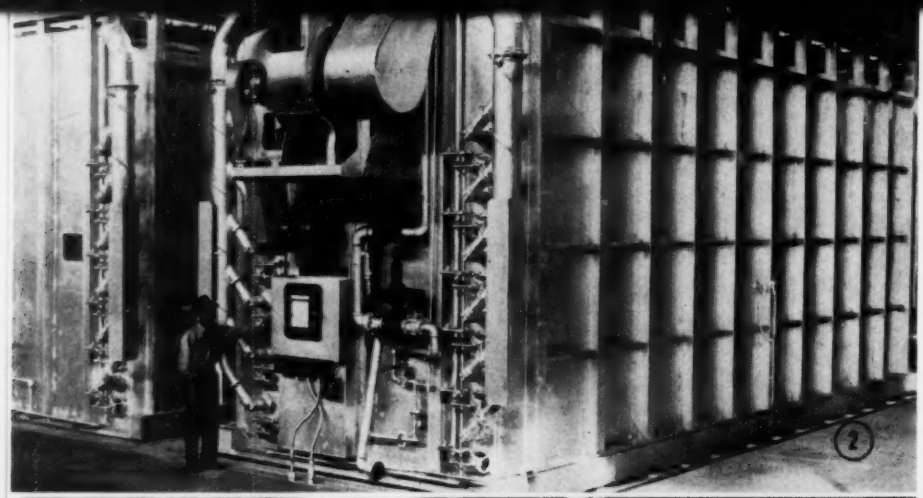


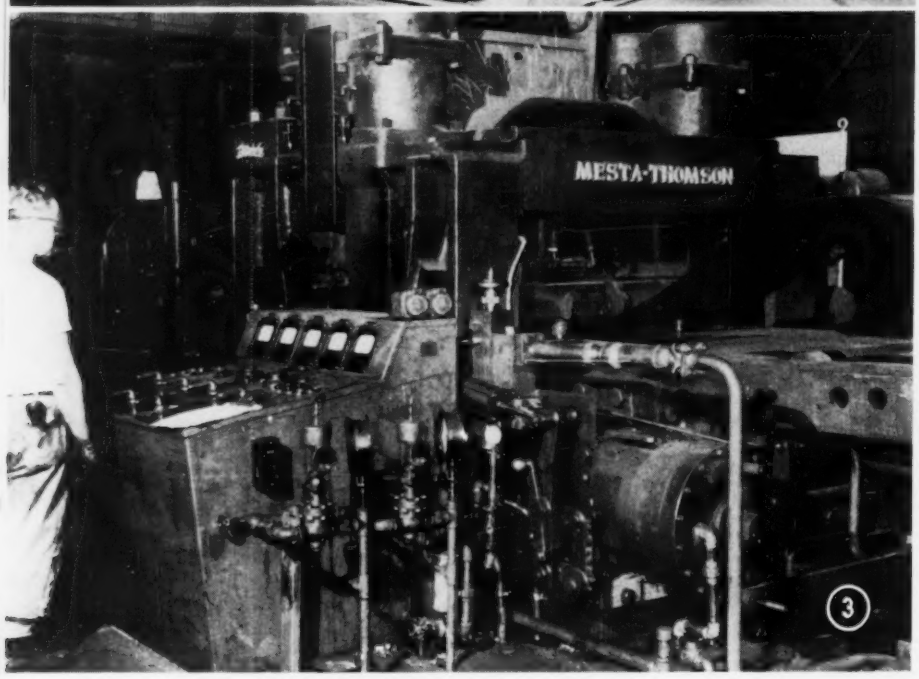


Fig. 2—New gas-fired radiant-tube-type annealing furnaces at Irvin works. All necessary temperature control equipment and other control mechanisms are mounted on one end of the furnace body. Normally unit operates in position of furnace shown at left to protect controls from any possible damage

Fig. 3—Flash welder installed in the pickling line for joining coils end to end to provide a continuous feed for the pickling which removes scale and dirt from material prior to cold reduction

ernization program. One phase of this work included installation of 10 four-stand bell-type sheet-coil annealing furnaces and 22 bases for operations with these furnaces.

The four-stand furnace bases each will accommodate, in a single line, four coil stacks 40 inches to 48 inches in diameter, with a maximum height consistent with lifting clearance requirements. Stack height is at least 155 inches. Each of the new furnaces weighs approximately 100,000 pounds.

Numerous design changes were effected on sheet temper mills Nos. 1, 3, and 4. These changes permit processing 20-inch and 24-inch inside diameter, by 78-inch maximum outside diameter, 50,000-pound maximum weight coils on the mills Nos. 1, 3, and 4, as well as individual sheets on mills Nos. 1 and 3. Three new, improved-type downtilters were installed to receive coils on end from an overhead traveling crane and deliver the coils on their sides onto the center of an apron-type coil conveyor.

The width of No. 3 mill was reduced from 84-inch to 56-inch roll face, and entry and exit tension roll bridles were furnished. The mill was speeded up to 2500 feet a minute, by means of new main-drive motors, motor-generator sets, controls, and so on, using existing equipment where suitable. Tension bridles were arranged to permit passing heavy-gage strip over the bridles.

Mill No. 4 was relocated between mills Nos. 1 and 3, a position formerly occupied by mill No. 2.

New shearing and recoiling facilities for the cold-reduced product finishing department include a 54-inch, high-speed, side-trimming and sheet-shearing line; an 80-inch slitting and recoiling line; an 80-inch side-trimming and sheet-shearing line; a scrap baller; and scrap trap for conveying side scrap to baller.

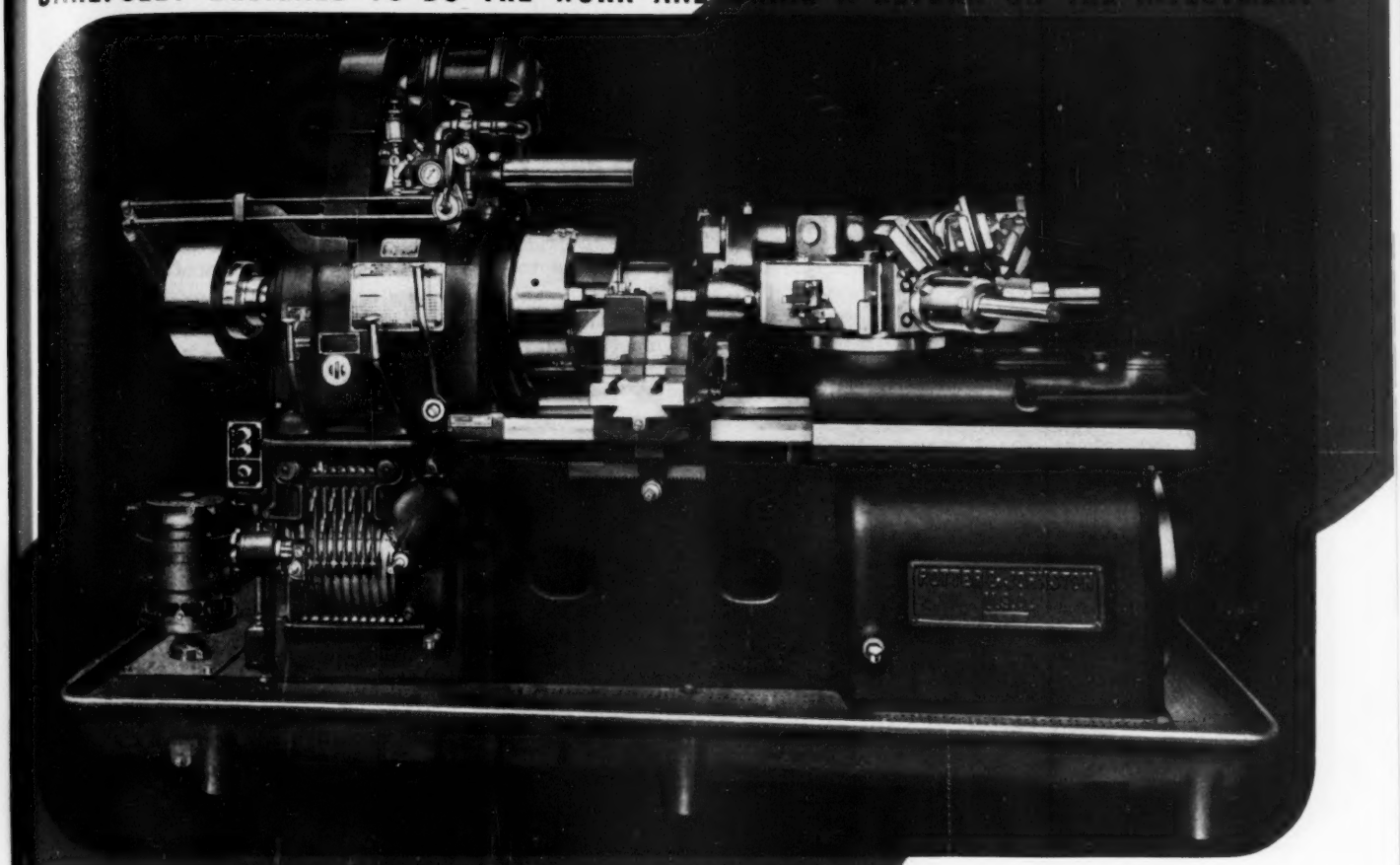
Material to be sheared on the 54-inch side-trimming and sheet-shearing line is cold-reduced, annealed and temper-rolled coils of regular carbon grades, 19 gage (0.0429-inch) to 30 gage (0.0123-inch). Entering coils have an inside diameter of 24 inches and an outside diameter of 72 inches maximum. Width may range from 18 to 50 inches maximum. Maximum coil weight handled is 50,000 pounds. The line produces sheets within the length range of 30 inches to 144 inches in increments of 1/16-inch, and widths between 18 and 48 inches.

Cold-reduced, annealed and temper-rolled coils of regular carbon steel grades, 14 gage and lighter, can be handled on the 80-inch slitting and recoiling line. Entering coils have an inside diameter of 24 inches and a maximum outside diameter of 72 inches. Coil widths range from 18 inches, minimum, to 77 inches, maximum, representing a maximum weight of 50,000 pounds. The line is capable of side trimming or slitting coils down to 12-inch minimum width, also for producing small coils for any width by shearing large coils.

One existing sheet-shearing line was dismantled and (using as basic equipment the flying shear, roller leveler, oiler, conveyors, scale, piler, and so on, from the dismantled line) a new 80-inch side-trimming and sheet-shearing line was constructed. Cold-reduced, annealed, and temper-rolled coils of regular carbon steel grades, 11 gage and lighter, can be processed on this line. Entering coils have an inside diameter of 24 inches and a maximum outside diameter of 72 inches. Coil widths may range from 18 to 77 inches, with maximum coil weight limited to 50,000 pounds. The line produces sheets 22½ inches to 180 inches long and 18 inches to 77 inches wide at a speed of 133 to 400 feet per minute.

The sheet-assorting type piler is capable of receiving 16 to 24 gage sheets, 18 to 77 inches wide by 45 to 180 inches long, from the sheet-shearing lines at an entry speed of 250 to 1000 feet per minute, and assorting them into prime and reject piles at a speed of 90 to 360 feet per minute.

CAREFULLY DESIGNED TO DO THE WORK AND BRING A RETURN ON THE INVESTMENT



5D POWER-FLEX AUTOMATIC TURRET LATHE

SPECIFICATIONS

		5D standard	5DE elevated	5DLX long travel and extended	5DELX
BED	swing over	25″	30″	25″	30″
CROSS SLIDE	swing over	12″	17″	12″	17″
	travel each way	5″	5″	5″	5″
TURRET	no. of faces	5	5	5	5
	slide travel	13″	13″	16″	16″

Frankly, a powerful automatic turret lathe costs a great deal of money. Aside from the excellence of the work it produces, it should earn its own way and kick back a substantial profit. Potter & Johnston's 12,500 lb. 5D POWER-FLEX AUTOMATIC TURRET LATHE meets all these requirements. Powerful and rigid, it has 4 automatic changes of spindle speed while under cut; 3 selective automatic changes of feed; automatic binding of the turret following index; powerful, direct cross slide action and a constant high speed rapid traverse motion to the cross slide and turret slide. All these factors contribute toward greater flexibility and higher productive capacity. The 5D POWER-FLEX is provided with a pan base which serves as a coolant reservoir when required. The increased first cost of this construction is amply justified by the resulting permanency of alignment, freedom from scoring, and long life. Send us a blueprint of a casting or forging and we will tell you to the fraction of a penny the cost of machining it on the 5D POWER-FLEX. From that point on you can figure the advantages of the 5D yourself.

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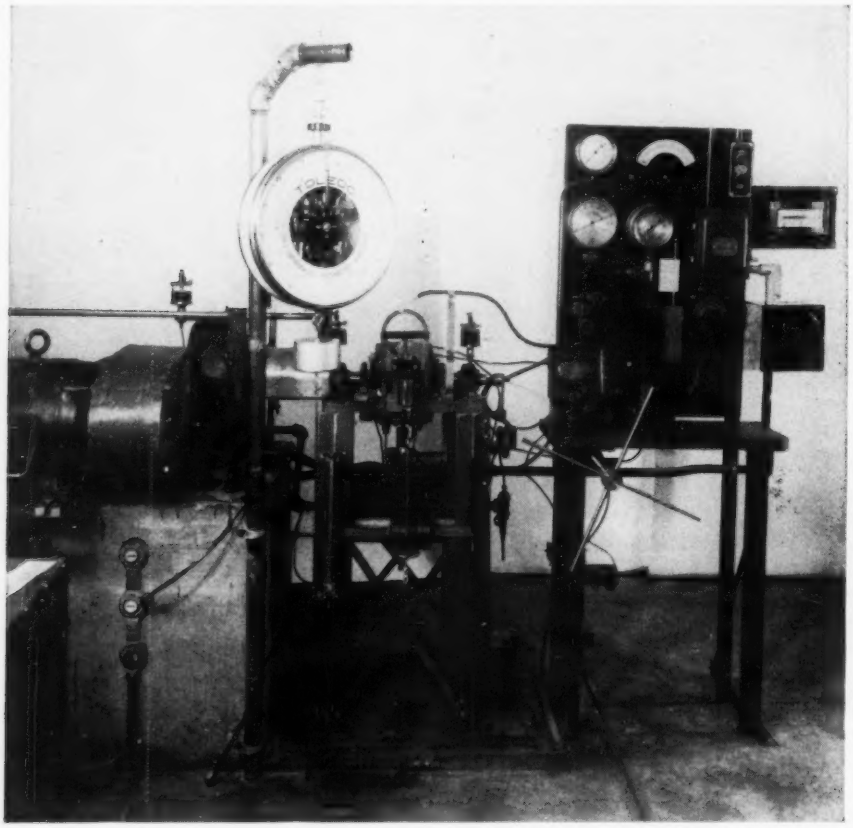
BEARING TESTS

. . . . determine safe loads

STUDY of bearing performance through measurements of the combined frictional and thermal behavior in journal-bearing lubrication has led the National Bureau of Standards to a practical graphical procedure for estimating safe bearing loads.

Using a four-bearing friction machine (pictured below), the bureau worked with bearings of two diameters, in two length-diameter ratios and three clearance-diameter ratios, and at two journal speeds. Three oils, of different viscosity, were used at three oil-inlet temperatures. Particular attention was given to the resultant effects of the combined hydrodynamic and thermodynamic actions involved in bearing operation with forced-feed lubrication.



The machine consists essentially of four test bearings on a common shaft, these being mounted in self-aligning ball-bearing swivels which are prevented from rotating by flat springs. The two outer bearings are fastened to the housing while the two inner ones are located in plates that slide in guides. The complete housing floats on a horizontal shaft and acts as a cradle dynamometer. Load is applied by hydraulic jacks under the two inner bearings.

Frictional-Torque Data

A study of the frictional-torque data for operation under load indicates that when a bearing is operating at constant speed, using a given oil at constant oil-inlet temperature and oil-feed pressure, an increase in load produces an approximately proportional increase in frictional-torque. The increase in torque with unit increase in load is influenced chiefly by the viscosity of the oil, the oil-inlet temperature, the oil-feed pressure, the clearance-diameter ratio, and the length-diameter ratio.

The results also indicate that, under these operating conditions, an increase in load causes a proportional increase in the fluidity of the oil in the bearing. For a given oil, oil-inlet temperature, and oil-feed pressure, this increase in fluidity is a function of the speed of the journal, the diameter of the journal, the length-diameter ratio, and the clearance-diameter ratio.

The straight-line relationship between fluidity and pressure provides a graphical means for estimating safe loads which should hold reasonably well in most bearing applications since under conditions typical of normal high-speed, high-temperature operation practically all of the heat generated in the bearing is carried away by the oil.

Nailable Steel Flooring Put in Railroad Cars

Progressing in the Altoona, Pa., shops of the Pennsylvania railroad is the installation of nailable steel flooring in 200 gondola cars. This all-purpose flooring, developed by Great Lakes Steel Corp., Detroit, consists of curved-flange steel channels separated by grooves into which ordinary nails can be driven.

Cars equipped with this flooring can handle finished goods which must be blocked in place by nailing to the floor as well as heavy rough materails which require a steel floor. It is expected that the Pennsylvania's cars will be particularly useful at steel mills served by the railroad since the same car, after discharging its load of inbound raw materials, can be loaded with outgoing finished products. This installation, reportedly the largest to date, is but one being carried out by 25 railroads.

Production Uses of Electric Heat Studied

Such types of industrial heating equipment as midget soldering irons and huge foundry furnaces were among the hundreds of applications studied by electric utility engineers at a General Electric Co. sponsored course held at Sacandaga, N. Y., recently. Purpose of the course was to study the ways in which electric heat could be extended throughout industry to cut production costs and improve product quality. Methods already in use in the manufacture of a variety of products and case studies of different types of electric heating equipment which have cut production costs were presented.

One paper presented the case of a manufacturer of domestic hot water heaters who was able to increase the production of one part 50 per cent by changing over to electronic brazing. Another stated that electric furnace brazing has made possible simplified product design, savings in material and lower production costs.

An Evaluation of BASIC BRICK in the OPEN HEARTH

Practical development of the basic roof started as a series of panel tests and eventually a complete basic roof was constructed on an otherwise conventional silica furnace. Findings demonstrated the practicability of the suspended construction and pointed out the necessity of complete basic ends

By VERNON W. JONES

Superintendent, Open Hearth Department
Armco Steel Corp.
Middletown, O.

INCREASED use of basic brick in open hearth furnaces has been one of the outstanding refractory developments of the last decade. Widespread application of basic materials to open hearth construction is the result of operators' efforts to increase production in the limited space available in the older shops. While the rapid increase in the use of basic brick has occurred in the last four years, present method of application is the result of experience gained since basic brick were first used above the slag line.

First application of basic brick in the open hearth furnace was made in the early 1890's when imported magnesite brick were used to form the subhearth of the furnace. Prior to that time, the subhearth was formed of magnesite or dolomite mixed with tar, and rammed into place. The burned magnesite brick subhearth, with a top surface of rammed in or burned magnesite, provided a much improved furnace hearth.

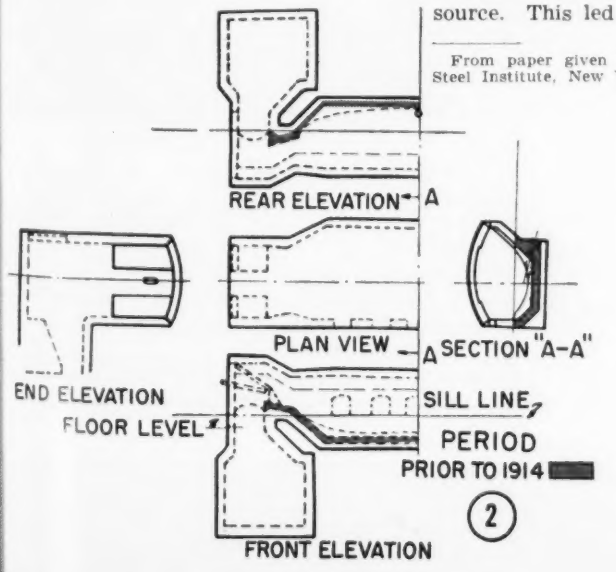
In 1895 the first magnesite brick were manufactured in this country, followed shortly afterward by the first domestic chrome brick. The chrome brick were used as a buffer between the magnesite brick and the silica brick. Both magnesite and chrome brick of this period were of low hot load capacity and had a tendency to spall. Consequently their use was limited to the hearth of the furnace below the foreplate. (Fig. 2)

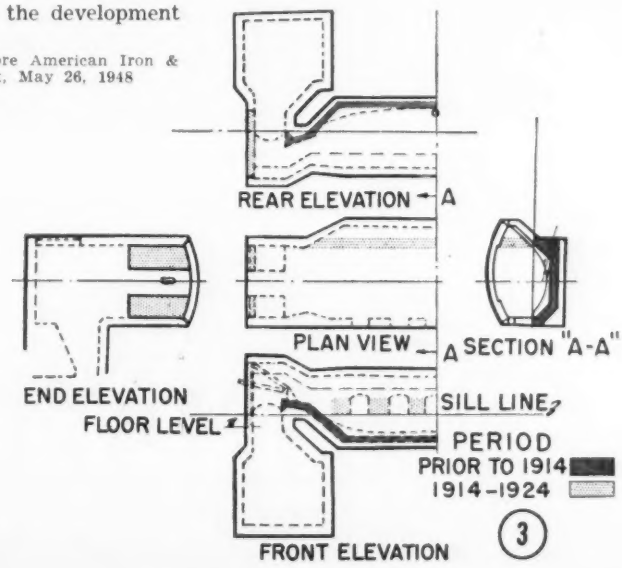
Magnesite Limited During World War I—In 1913 the steel tube, rammed full of burned magnesite, was developed and by 1915 was in general use in backwalls, endwalls and bulkheads. This marked the first practical application of basic materials above the foreplate. During the first world war, the foreign supply of magnesite was limited and it became necessary to find another source. This led to the development of the magnesite deposits in the state of Washington which today are the source of most of the magnesite used in this country. Chrome brick came into general use during this period first as a substitute for magnesite. As the physical characteristics of chrome brick improves the refractory manufacturers found general use for them in frontwalls, backwalls, endwalls and bulkheads. (Fig. 3)

With the advent of the sloping backwall, there was a great increase in the use of basic materials. The development of the sloping backwall coincided with the development of chemically bonded magnesite brick and chrome-magnesia brick, both burned and chemically bonded.

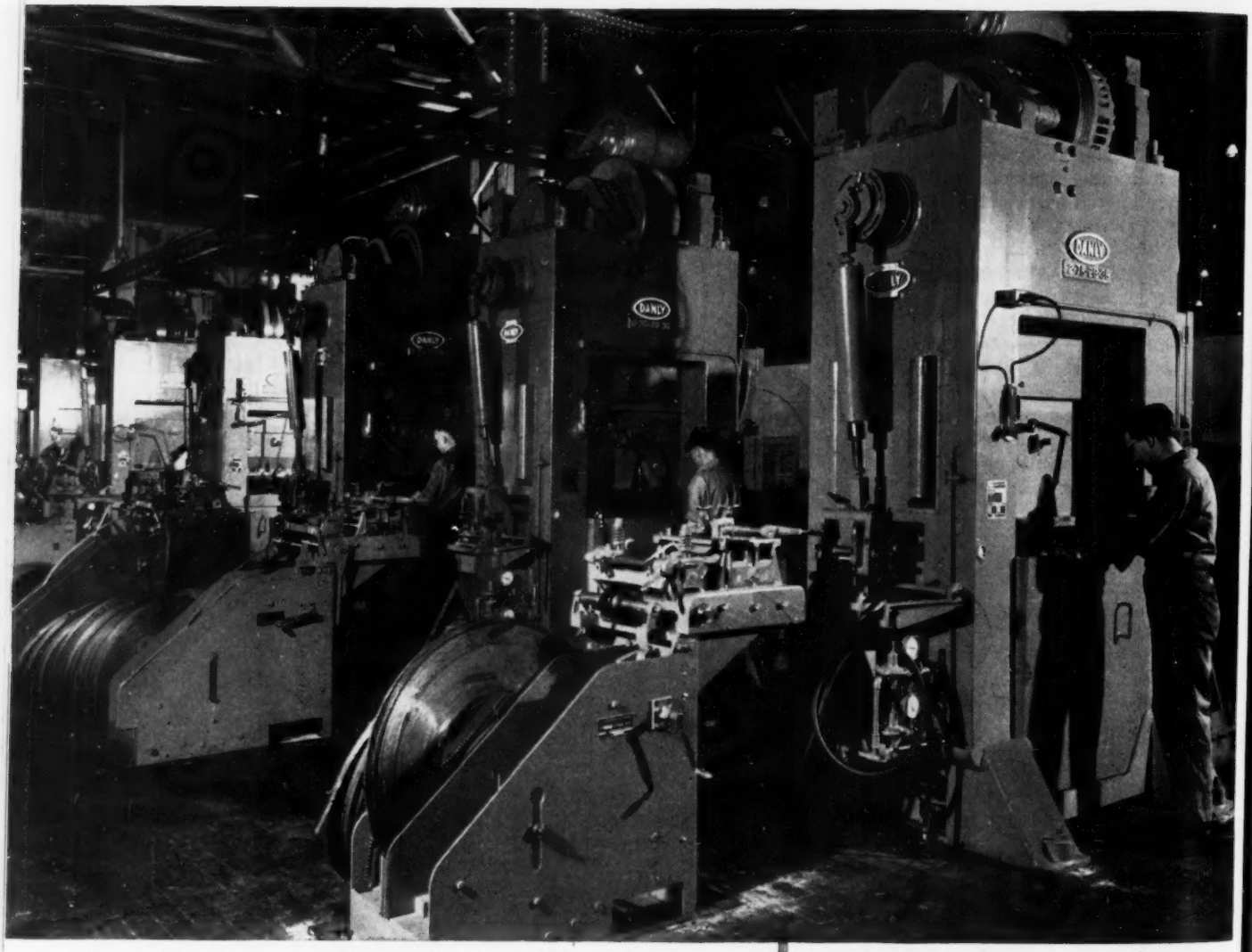
The improved chrome-magnesia brick rapidly replaced silica for port corners and made it possible to maintain the desired furnace lines for a longer period of the furnace campaign, contributing to the development of faster melting speeds and increased production. The burned

From paper given before American Iron & Steel Institute, New York, May 26, 1948





CONTINUOUS CHAIN MADE with DANLY PRESSES



View at Chain Belt Company, Milwaukee, Wis., showing battery of Danly Two-Point 75-Ton High Production Presses equipped with automatic roll feed and chain spool producing continuous chain automatically.

JOB FACTS

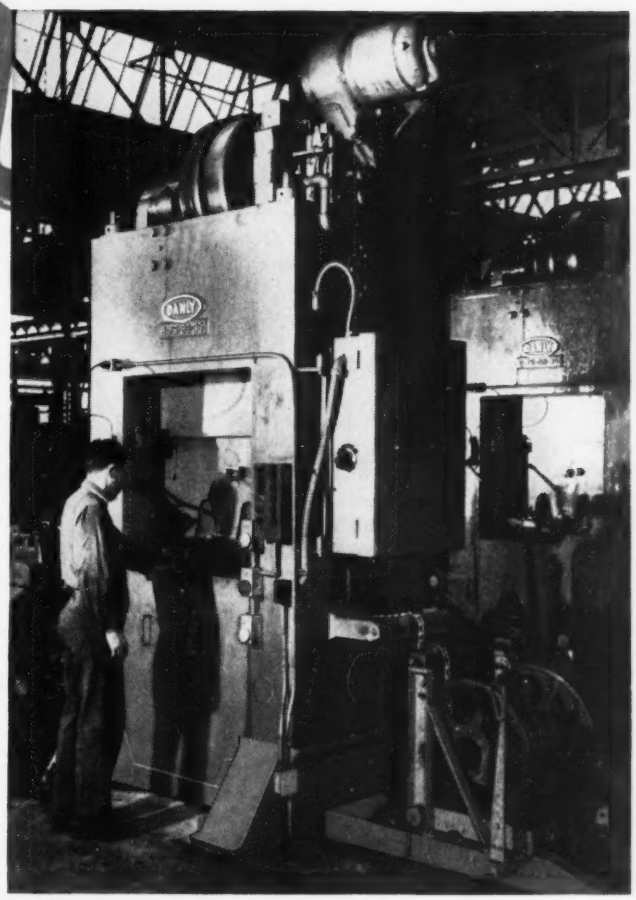
Press: Danly, 75-Ton Capacity.
Part Name: Steel Detachable Chain.
Job: Stamping, Forming, Complete Chain, 7.4 links per foot.
Material: Steel Strip—.105" x 17/32".
Die Sets: Danly Standard Die Sets. Progressive Dies.
Rate of Operation: Complete Link Per Stroke, per machine.
Auxiliary Equipment: Automatic Feed and Automatic Spool Winder for Completed Chain.

DANLY

PRECISION DIE SETS...STANDARD AND SPECIAL

AUTOMATICALLY FROM COIL

EQUIPPED WITH AUTOMATIC ROLL FEED AND CHAIN SPOOL

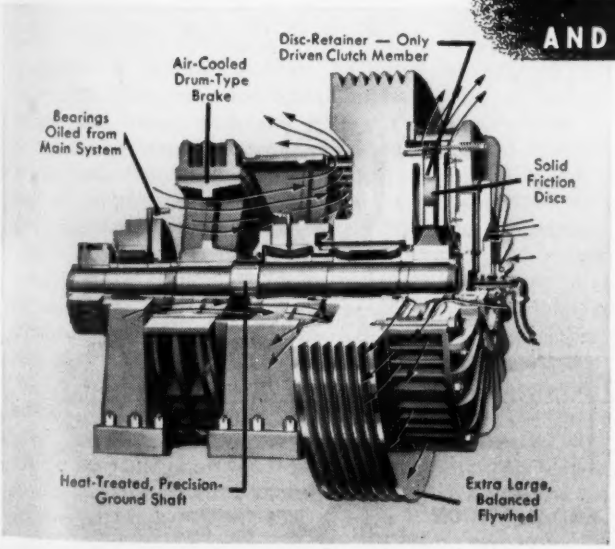


At Chain Belt Co. continuous steel detachable chain is manufactured complete on each of these Danly presses at the rate of a link per stroke. Operations consist of blanking, piercing, forming, and assembling the chain from steel coil stock which is fed automatically.

PRESSES GIVE LONG TROUBLE-FREE SERVICE

The resulting low manufacturing cost of this high speed operation is not the only economy effected. Extra savings accrue because the presses are designed to stay on the job longer, eliminating expensive down-time. For example, the frames of Danly presses are extra-heavy, welded steel construction, which are fully stress-relieved before machining. This assures continued alignment and a minimum of bed deflection—*no more than .0006" per foot of bolster width.* In turn, accuracy of die alignment is maintained which gives more stampings per die grind and longer die life.

Further, long trouble-free operation is assured by the Danly automatic filtered oiling system. Clean, filtered oil is piped directly to each gear, bearing, and driving member—*including the flywheel bearings.*


Disc-Retainer — Only Driven Clutch Member
Air-Cooled Drum-Type Brake
Bearings Oiled from Main System
Solid Friction Discs
Heat-Treated, Precision-Ground Shaft
Extra Large, Balanced Flywheel

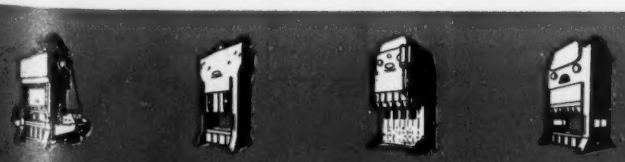
DANLY VENTILATED CLUTCH CUTS DOWN-TIME AND PRESS MAINTENANCE COSTS

The new Danly Ventilated Clutch is another exclusive feature that offers unusual advantages in reducing press down-time and maintenance costs. High velocity air ventilation eliminates over-heating. The drive shaft, gears and bearings are fully lubricated automatically. *Test runs under full load show negligible disc wear after more than 8-million successive clutch engagements.*

WRITE FOR MORE FACTS

Write today for more facts on the time-saving features of Danly Presses. Find out how Danly Presses can help you cut stamping costs. Ask for a complete presentation and a production estimate.

DANLY MACHINE SPECIALTIES, INC.
2100 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS



MECHANICAL PRESSES AND PRESS EQUIPMENT

25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

chrome - magnesia brick replaced chrome brick in initial frontwalls, including arches. These gave exceptionally good service, in many cases lasting for a roof campaign. The unburned chrome-magnesia brick came into general use for hot job frontwalls.

Early Use of Basic Material Proved Unsuccessful—Improved physical properties of the basic brick developed during this period were responsible for the revival of interest in basic roofs. However, early trials of basic material in open hearth roofs in the late 1920's and all through the 1930's were not successful. These consisted of basic shoulders in conjunction with a sprung silica roof and small sections of sprung basic roofs. In 1935 reports were received of the successful operation of basic roofs in Germany. The following year the English operators reported basic roofs in operation. The structural design and materials used in the European basic roofs were not applicable to the furnace size and operating practices of American plants, as demonstrated by the experience of one company that tried to apply the foreign design. (Fig. 4)

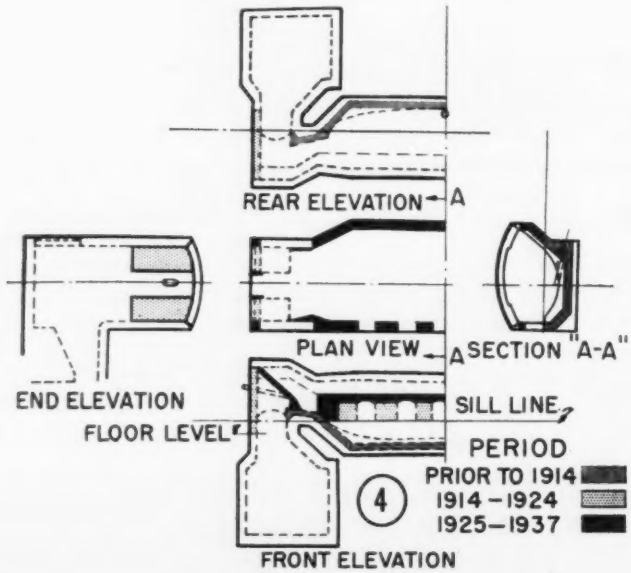
Practical development of the basic roof started as a series of panel tests and eventually a complete basic main roof was constructed on an otherwise conventional silica furnace, at the Johnstown plant of Bethlehem Steel Co. These tests were conducted between 1940 and 1942 with various basic brick being used. A method of suspension similar to that used successfully in the construction of copper reverberatory furnaces was tried. These tests were not successful chiefly because furnace shutdowns for repairs to frontwalls, backwalls and end sections were detrimental to the basic roof. However, these tests did demonstrate the practicability of the suspended construction and pointed out the necessity of complete basic ends. This series of tests was concluded in 1942. (Fig. 5)

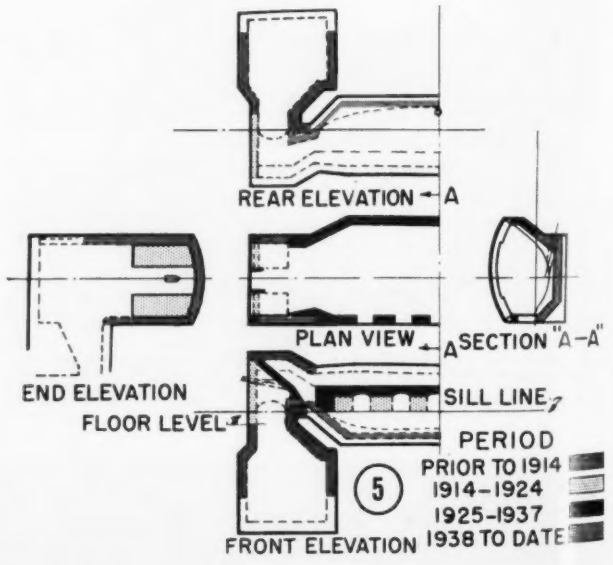
Basic Ends Provide Economy — Shortly after the conclusion of the Johnstown tests, a roof of similar design was operated for several campaigns, both with and without basic ends, at the Ford Motor Co. The basic roof was discontinued, but the basic ends were retained as economical installations. Almost coincident with the conclusion of the Johnstown tests, early tests on basic ends were started at the Steel Company of Canada in Hamilton, Ontario. In January, 1943, an experimental basic end, which was the fore-runner of all the present installations, was built on one end of a 50 ton furnace. Only the port roof and the under cut chill wall on this furnace were built with suspended construction. The balance of the walls were partly solid basic and partly veneered with basic brick. The primary purpose of this experimental installation was to obtain granular, easily removed slag.

Success of this installation led them to convert a 180 ton furnace to a basic end unit in April, 1944. In this furnace, bands of suspended wall tile were altered with conventional masonry sections throughout the uptake walls. Since that time, bands of suspended brick have been brought together progressively until only one course of brick separates the supported bands. This furnace has demonstrated in service the practicability of the suspended construction of basic ends. The advantages of the suspended type of construction were recognized and the expansion of basic end furnaces has been rapid. At the present time there are 18 furnaces in operation with complete basic ends, two of which have basic main roofs. In addition, there are ten basic ends on order or being installed.

Armco Steel Corp. is operating eight of the above furnaces, six at Middletown, one at Ashland and one at Houston. The operating experience explained here is that of the Middletown division, which installed its first basic end furnace in October, 1944.

Lower Maintenance Basic End Furnaces — Cost comparisons between basic end furnaces and conventional silica end furnaces show that the basic end furnace is operated at a lower repair cost per ton. The No. 7 furnace (basic ends) was put into operation in October, 1944. The entire expenditure for basic end construction is used in the comparison chart. The No. 4 furnace (conventional silica construction) has operated through the same period. These two furnaces were chosen so that the comparison would reflect the increased costs of labor and materials over the period. Fig. 1 covers a period of forty-two months of basic end furnace operations. An accumulative repair cost of the two furnaces is compared to the shop total repair cost for the same period. After 800 heats the basic end furnace was equal in repair cost to the shop average. After 1380 heats the basic end furnace repair cost was the same as the silica end furnace used for comparison purpose. At the present time the basic end furnace repair cost is 28 per cent under the shop



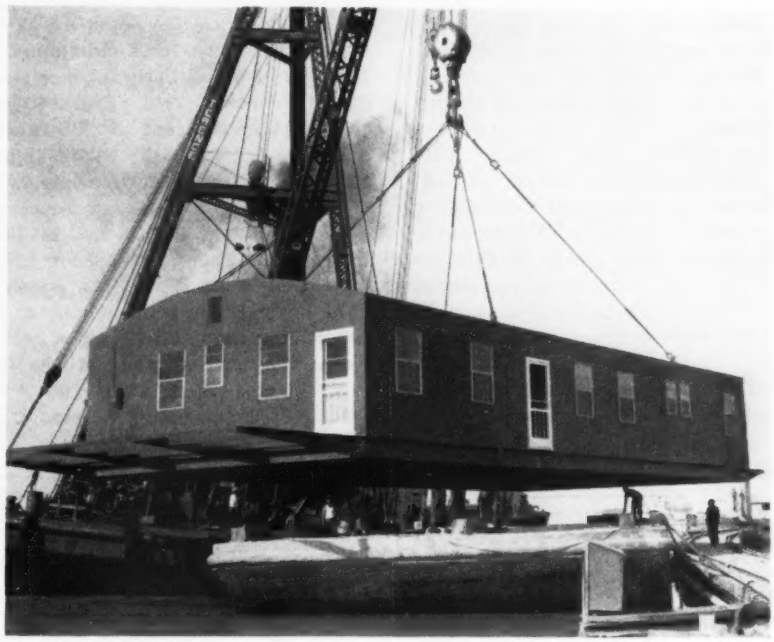


average and 11 per cent under the silica end furnace used for the comparison.

The first furnace constructed with basic ends has made 2143 heats to date (Mar. 1, 1948). The silica end furnace (No. 4 used in the above comparisons) has made 2081 heats in the same period. With all furnaces of basic end construction, we can reasonably expect a production increase of 3 per cent or 27,000 tons per year.

Suspended Construction—This type construction has made it possible to schedule furnace repairs with a much higher degree of accuracy. As mentioned above, campaign life of a furnace is now regulated by roof life. Except for frontwall repairs we have never had to take a basic end furnace out of operation for anything but a main roof. As the main roof can be inspected daily and repairs planned accordingly, shop operations are not interrupted by unexpected shutdowns of furnaces caused by the failure of some hidden or inaccessible part of a furnace. Suspended construction has eliminated the danger of failure of furnace sections caused by difference in expansion rates between old and new silica brickwork. Such failures have happened even when great care was taken in heating the furnace after a repair. Occurrence of such failures resulted in the establishment of arbitrary repair schedules, wherein certain parts of a furnace were replaced at stated intervals, regardless of the condition of the part at the time of the repair. This practice caused longer repair periods and excessive labor and material costs. Suspended construction permits patching of individual sections, without disturbing any other section. It is now possible to get more life from each individual brick. This does away with the necessity of replacing large areas of very good brickwork due to localized weakening of supporting arches, as happens with conventional construction.

The method of brick suspension used in basic ends permits the use of a single uptake. This increase in uptake area results in a reduction of flue gas velocity, which should reduce erosion appreciably. We have had one campaign on a furnace with single uptakes and we believe this furnace will require less repair work in the uptakes than a double uptake furnace. The single uptake furnace, which does away with the division arch and burner port cooler, requires less cooling water. In a plant using a recirculating water system, this results in a considerable saving in water and fuel consumption.



STEEL HOUSES ON PILING: Housing problems for personnel engaged in offshore drilling operations of Ohio Oil Co. in Gulf of Mexico are solved by prefabricated steel quarter house and mess rooms built by Avondale Marine Ways Inc., New Orleans. The 75-ton quarter house, complete with furniture and the 33-ton mess room, also with furniture are so framed that they may be lifted at four points, making it possible to load the houses on barges for transportation and subsequent mounting on piling. Connection to fresh water and electric lines makes them ready for occupancy

The basic end furnace has less out time for repairs due to first, less repairs being necessary and second, the repair being made faster. The out time on basic end furnaces averaged 154 hours per furnace less than silica furnaces for the year 1947. This means that fewer bricklayer hours are required, which is an extremely important item at this time in our plant as well as in most steel plants.

Fuel consumption per ton of product is lower in the basic end furnaces than in the conventional silica end furnaces. This is due to a variety of reasons:

1—Repairs are made faster, so less fuel is required to bring furnaces back up to operating temperatures.

2—Less out time for repairs.

3—The campaign length is regulated by roof life. The slag pockets and flues are cleaned out on each repair so that the operating speed of the furnace is the same throughout each campaign.

Blasting Unnecessary — We use dynamite to remove slag from silica end furnaces. The deposit in the slag pockets of the basic end furnaces is granular and can be removed with a shovel. As dynamiting is not necessary, one of the hazards of furnace repairing is eliminated. The deposit in the slag pockets is of such an analysis that it can be used as sinter in the blast furnace or open hearth.

The present basic end construction has made it possible to eliminate all of the silica brick except that used in the main roof and, in our case, that part of the port roof over the aprons. The elimination of this large amount of silica brick reduces the dust hazard considerably, and when basic roofs are found practical, the silicosis problem will disappear so far as the open hearth furnace is concerned. There is also a distinct advantage from the personnel standpoint. Brick masons prefer to work on basic end furnace repairs, probably because of less dust. There is constant pressure from helpers working on silica end furnaces to have their furnaces converted to basic ends. They see that the helpers on the basic end furnaces have more days' work each year and earn a higher incentive pay due to less out time for repairs.

Time consumed in removing slag

from slag pockets has been the controlling factor in the length of silica end furnace repairs. This job is completed in much less time in a basic end furnace repair, so that now removal of dust from flues and changing of checker brick is the time consuming element of the repair. This has focused more attention on improvement in mechanical methods for flue dust removal. Considerable progress has been made in this respect, but much more improvement is needed, so that the full benefit may be derived from the all basic furnace of the near future.

The development of the all basic furnace is now in progress. Steel Company of Canada, after making the early tests with basic ends, has carried on with development of the basic roof. The tests culminated in the trial of an all basic furnace starting in February, 1945. The construction used in the roof of this furnace was modified from the earlier Johnstown trials to cut down the amount of corbelling on the roof face. To date this furnace has had 4 basic main roofs, the present roof giving indications that it will run considerably beyond the point where it will break even in cost with silica roof.

The all basic furnace of the Carnegie-Illinois Steel Corp., at South Chicago, is constructed similar to the Steel Company of Canada furnace. This furnace is operating on varied practices such as increased fuel rates, oxygen in combustion, etc., so that furnace life cannot be compared to a furnace operating under normal conditions. No cost data on the operation of this furnace have been published but performance to date, under extremely severe operating conditions, has demonstrated that the completely basic furnace is practical and economical.

Construction technique of basic ends and roofs has improved rapidly. The first basic ends permitted excessive air infiltration in the early stages of a furnace campaign. This condition has been improved by replacing the combustible expansion spacers with a corrugated metal plate. The outer two corrugations are filled with a suitable packing material, and the inner surface trowelled with chrome cement. This method of construction provides ample room for expansion, and has greatly reduced air infiltration. Early basic port roofs were built with vertically hung tile, the arched contour being obtained by corbelling. The exposed edges of the brick failed in the early stages of the campaign, caused mainly by transverse stresses. The development of the radially suspended roof provides a smooth surface inner roof contour. Service tests indicate an increased life of port roof section.

Development of Open Hearths — It is interesting to note the interrelation of the several factors that have contributed to the present state of development of open hearth furnaces. Steel clad magnesite brought basic materials up out of the hearth, and started their use in exposed locations. The sloping backwall gave further impetus to the use of basic materials above the foreplate. These two structural improvements resulted in improved basic brick, which permitted the use of this brick in maintaining furnace lines. This has resulted in better operating conditions, and has promoted the use of higher flame temperatures. This in turn put the responsibility back on the structural engineers to find practical methods of using the better physical properties of the basic brick.

It is reasonable to expect further improvements in materials and construction methods, which, if they evolve as rapidly as in the past six years, will result in a completely basic furnace that will show tremendous improvement in production rates, operating costs and, with higher temperatures attainable, in improved quality.

Water Cooling . . .

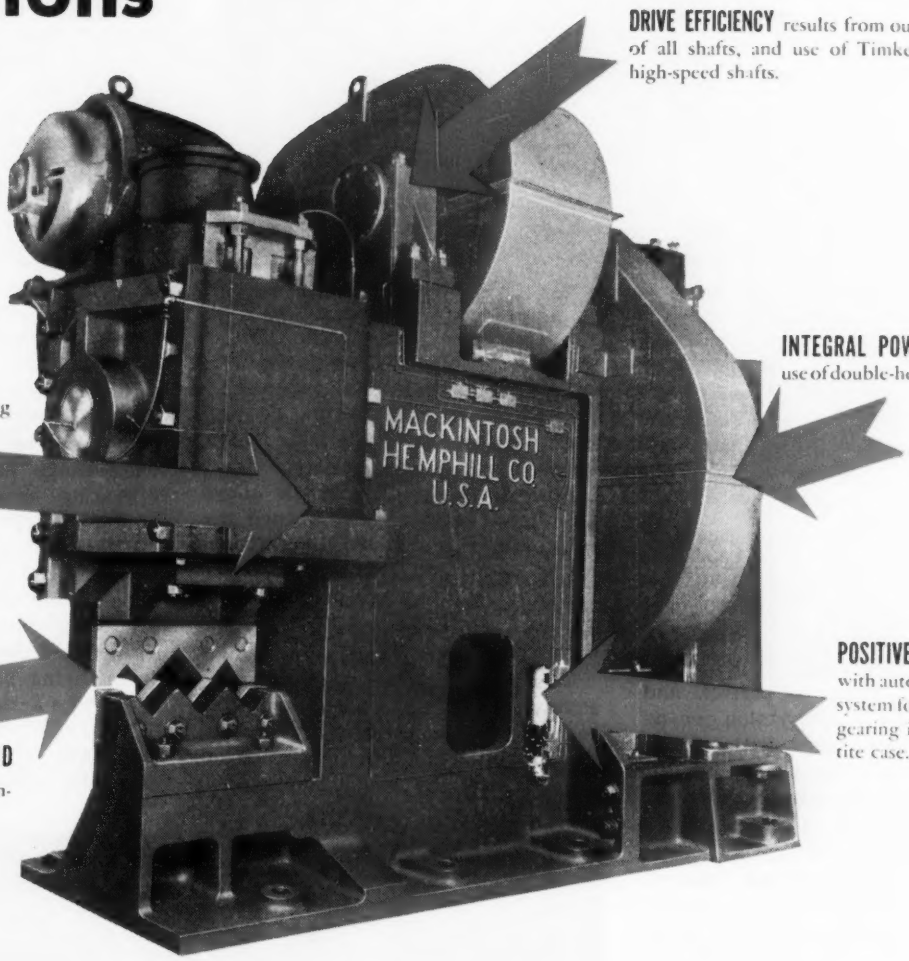
Speeds charge of plant truck batteries

FACED with round-the-clock need for industrial trucks, engineers of Reynolds Alloy Co., Listerhill, Ala., devised a unique system for water cooling storage batteries while on charge. Cooling action allows faster charging, thus keeping trucks in operation for three shifts on only two sets of batteries per truck. The system also prolongs the life of the batteries by preventing excessive temperatures usually developed under accelerated charging.

Charging racks are in the form of long concrete pits, with individual spray pipes containing cool well water installed under each charging position. Batteries taken directly from trucks and placed over the pits receive the immediate cooling effects of the spray.

The charging station, which keeps 54 batteries at high operating efficiency, also features a combination air-water nozzle which effectively washes and dries battery tops, and a paint vat into which the batteries are dipped for repainting.

High-speed cut-off shears pace production in continuous forging operations



DRIVE EFFICIENCY results from outboard support of all shafts, and use of Timken bearings on high-speed shafts.

INTEGRAL POWER assured by use of double-helical gear train.

OVERLOAD CAPACITY resulting from heavy cast steel frame.

POSITIVE LUBRICATION with automatic pressure system for bearings, and gearing in enclosed oil-tite case.

RAPID KNIFE CHANGES AND ADJUSTMENT facilitated by open-throat construction.

Designed to prevent lags in the cut-off operation in modern high-speed forging practice, Mackintosh-Hemphill Shears embody the essential features for maintaining continuous production cycles.

Manufactured in six sizes, with capacities ranging from 150 to 1250 tons, Mackintosh-Hemphill Shears can be operator-regulated to conform to the cut-off requirements of automotive and industrial forge shops, and cropping and dividing operations in continuous bar and billet mills.

The high production rate and all-'round flexibility of Mackintosh-Hemphill Shears result from these important advantages—

(a) Overload Capacity (b) Drive Efficiency (c) Integral Power (d) Rapid Knife Changes and Adjustment (e) Positive Lubrication

Whenever cut-off operations must be geared to high-speed forge shop or continuous bar mill practice you'll find that Mackintosh-Hemphill Shears can set the production pace.

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Makers of the Rolls with the Red Wabblers

OTHER MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: ROLLS . . . STEEL AND SPECIAL ALLOY CASTINGS . . . COMPLETELY INTEGRATED STRIP MILLS . . . HEAVY DUTY ENGINE LATHES . . . THE NEW MACKINTOSH-ABRAMSEN STRAIGHTENERS . . . IMPROVED JOHNSTON PATENTED CORRUGATED CINDER POTS AND SLAG HANDLING EQUIPMENT . . . SHAPE STRAIGHTENERS . . . SHEARS . . . LEVELLERS.

CONTROLLED Welding and Heating

. . . important factors in fabrication of hollow steel aircraft propellers

By ARTHUR Q. SMITH
American Gas Association
New York

WHEN an airplane is being tuned up for a flight, adjustments of many kinds can be made on the engines, controls and other mechanical or electrical devices so that everything will be in proper and safe operating condition. Not so with the propeller blades. They must be perfect, and anything short of perfection means immediate replacement with a new one. Therefore, blades must be perfect when they leave the factory.

Curtiss-Wright Corp., Propeller Division, Caldwell, N. J., manufactures hollow steel blades for all types of airplanes. Their production processes are as nearly perfect as it is humanly possible to make them.

In the early days of flying, aircraft performance was limited, requiring of the propeller only its elemental function—the conversion of engine torque into thrust. As engines with vastly increased power became available, and as new alloys and improved techniques opened the way for refinements in aircraft design that pointed toward greatly increased performance, the propeller was called upon to fulfill tasks unknown to its prototype.

Today the aircraft propeller constitutes an outstanding contribution to aeronautical engineering in performing numerous functions essential to the safe and efficient operation of modern airplanes. Efficiency considerations require that the blade angles of a propeller be controllable during flight. Modern aircraft performance depends on propeller versatility.

Blades must be adjustable over a wide range of angles to meet all operating conditions. High pitch settings afford increased speed, substratosphere altitudes and effective diving. The positive setting of approximately 90 degrees used for feathering and the negative setting (reverse thrust) used for handling large flying boats on the water, indicate the desirability of an extensive range.

Weight is an important factor in propeller design, as in aviation gen-

Fig. 1—After being formed, blades are annealed in gas-fired pit type furnaces for 12 hours at 1200° F. On completion of annealing cycle, furnace is shut off and the charge allowed to cool slowly in a closed furnace with the prepared atmosphere still maintained

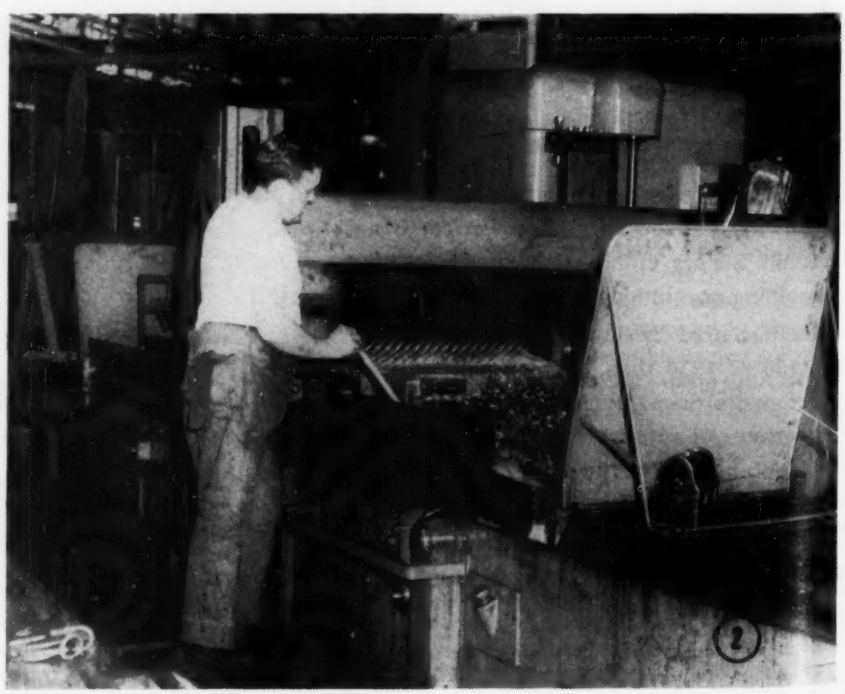


Fig. 2—First operation in manufacturing a hollow steel aircraft propeller blade is rough milling on rolled steel plate

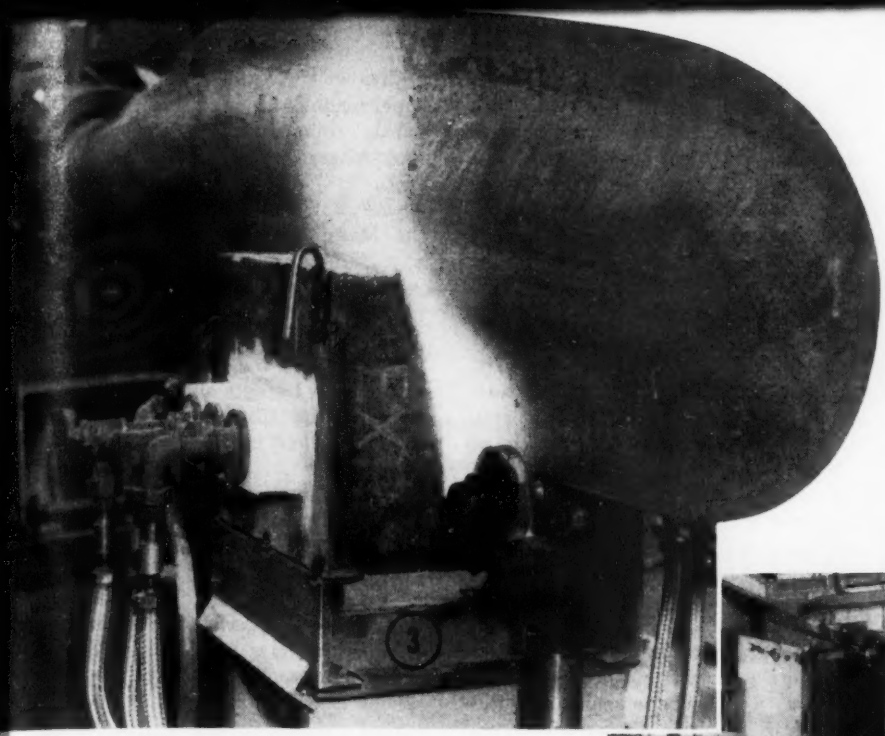


Fig. 3—Gas-fired radiant cup burners on each side of the blade effect the braze at 1960° F. An atmosphere is maintained inside the blade during the brazing operation

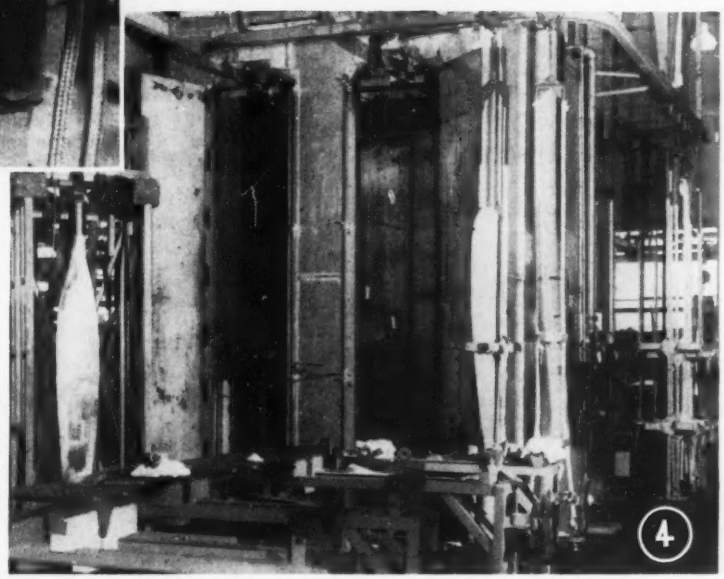


Fig. 4 — Chrome finish on blades and rubber linings are processed in this gas-fired externally-heated convection oven

erally. Untiring research with hollow blade designs and new materials has yielded propellers incorporating economy of weight as well as the strength for high power output applications.

Erosion resulting from abrasion shortens a propeller blade's service life. Blade material, therefore, must be sufficiently hard to resist the abrasive action incurred when fast-revolving blades come in contact with stones and gravel on airports and with water spray during flying boat operation.

The Curtiss-Wright hollow steel blade is made by welding together two formed sheets of alloy steel. Rolled steel plates SAE 4320 and SAE 4330 are used.

In the case of larger blades, rolled steel plates have a center rib while those for smaller blades do not. Shank and camber face are formed from one sheet, and the thrust face from another. First operation is rough milling of the plates, the largest ones weighing in the neighborhood of 750 pounds, to a certain thickness which is further reduced by grinding. Thickness is varied throughout the entire length of the blade according to design specifications. Blades are then blanked in large presses and cold-formed dies.

Heat Treating—Heat treating in various forms is used throughout the manufacture of blades. First operation after blanking and forming is annealing in gas-fired pit type radiant tube muffle subcritical furnaces under full automatic temperature control. Fired with premixed gas, several blades are lowered into a furnace at one time and annealed at 1200° F for 12 hours, at temperature. The furnace is charged with a prepared atmosphere consisting of 6 per cent CO_2; zero illuminants; zero O_2; 17.2 per cent CO; 10.6 per cent H_2; 0.4 per cent CH_4; balance N_2. Dewpoint -15° C. When the annealing cycle is completed, the furnace is shut off and the charge allowed to cool slowly in the still closed furnace, with the atmosphere maintained until blades are removed.

Blade halves are welded together in automatic machines by the atomic hydrogen welding process which gives high-strength and uniform weld. This weld is along the leading and trailing edges in a seam that converges at the shank and extends to the root end of the blade.

After every operation a careful inspection is made and several times during a blade's manufacture complete x-ray photographs are made of the entire blade. As many as ten to twelve 13 x 17-inch negatives are needed to cover one blade. Nothing is left to chance; each operation must be perfect. If any defect cannot be remedied, blade is scrapped.

To reinforce the welded edges of the blades and to provide a sort of "cushion", a copper-manganese fillet is brazed to the steel on the inside. Special instruments are used to deposit a proper amount of copper manganese granules along the inside of the blade. It is then put into an automatic machine which feeds the blade edge between two groups of gas-fired radiant burners. At a temperature of 1960° F, maintained by automatic temperature control equipment, the brazing is effected. A prepared atmosphere is introduced inside the blade during the brazing and consists of: Zero CO_2; zero O_2; 0.3 per cent illuminants; 12 per cent CO; 10.5 per cent H_2; 0.4 per cent CH_4; balance N_2. Dewpoint -60° C. First one edge has the fillet brazed, then the other edge, followed by a rigid inspection. From time to time random samples of work are taken to the metallurgical laboratory for thorough check.

To complete the blades, considerable hand grinding must be done to attain the exact contours and thicknesses. Blades must be balanced exactly, and grinding operations are

utilized to remove a little metal here and a little there to attain this balance. An electronic device is used to check the blade's metal thickness. It is a sonic measuring device, the Reflectogage, which indicates thickness on an illuminated graph. The blade material must be within prescribed tolerances and varies from 0.282-inch at the widest part of the blade to a 0.063-inch at the top.

Blades are hardened in rotary pit furnaces in a prepared atmosphere to secure the desired hardness of rockwell C of from 27 to 33. Atmosphere entering these furnaces is: 1.8 per cent CO_2; 0.6 per cent illuminants; zero O_2; 25.5 per cent CO; 23.8 per cent H_2; 0.4 per cent CH_4; balance N_2.

Other hardening operations are performed on the many gears which go to make up the hub assembly of the mechanism to control the variable pitch of the propeller blades. For this heat treating operation, gas-fired radiant tube chain belt furnaces under automatic temperature control are used with the following prepared atmosphere: 5.5 per cent CO_2; 1.5 per cent illuminants; zero O_2; 20 per cent CO; 18 per cent H_2; 6.5 per cent CH_4; balance N_2. Atmosphere ratio to raw gas is 5:1. Temperatures in these furnaces range from 1460° F to 1620° F at from ½ to 5-hour cycles depending on the depth of case required for the particular gears being hardened. Full automatic controls keep temperatures within prescribed limits.

Use of prepared atmospheres for the several heat treating operations described above, with a different atmosphere for each, runs into a considerable volume of gas. All these special gases are prepared at one central point and piped to the respective furnaces around the plant. Atmosphere generating equipment consists of a Westinghouse Mono gas generator, Electric Furnace Co. endothermic generators, and a Kemp atmosphere generator. Located in a separate enclosure and under the supervision of an engineer, the accurate composition of the prepared atmospheres is under constant control.

One of the final tests on blades is the Magnaflux test which shows up any defects in the steel proper or welds. The operation consists of flowing a mixture of fine iron filings and kerosene over a blade and periodically sending a magnetic field through the blade. Defects show up in a pattern of the iron filings where the magnetic field is interrupted by such a defect.

Last operation on blades is chrome plating. This finish is baked on in an externally air heated vertical convection oven, the input rating of which is 1 million Btu. Blades are hung from an overhead track and the chrome finish is baked on at 520° F for 4 hours and 15 minutes. In some blades a vulcanized rubber rib is inserted on the inside of the blades. Vulcanizing is done in the same oven at 200° F for 3½ hours.

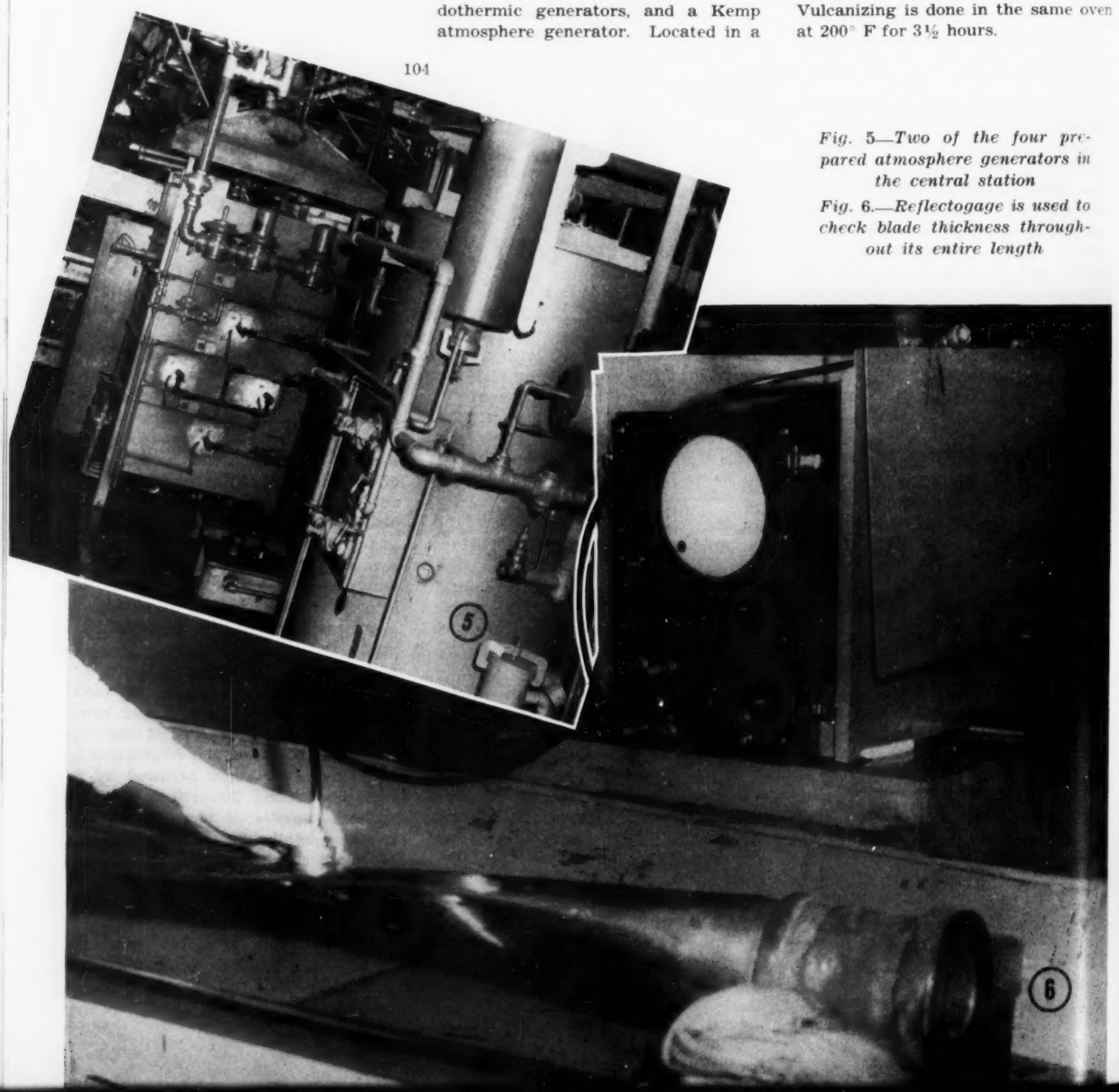
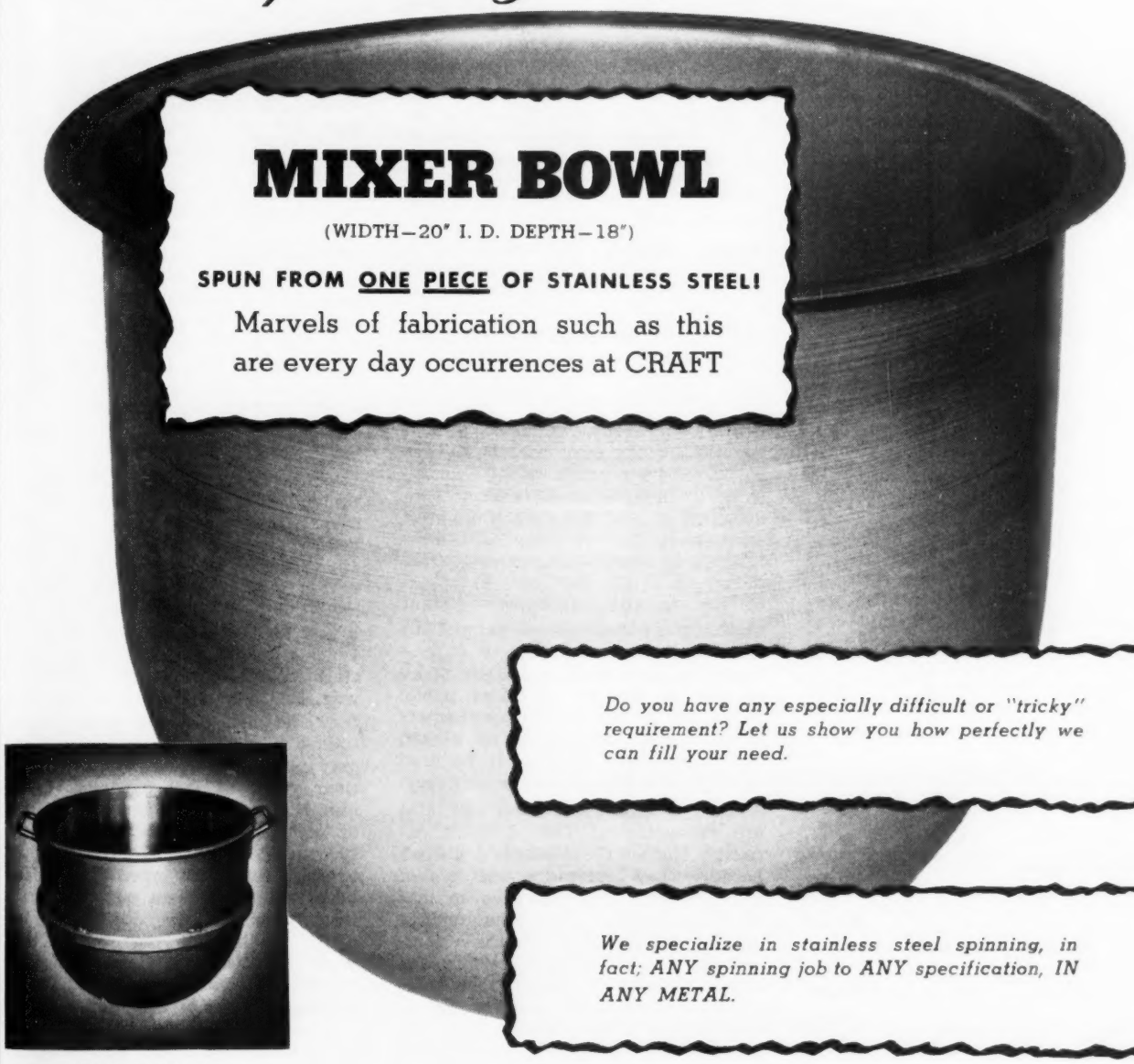


Fig. 5—Two of the four prepared atmosphere generators in the central station

Fig. 6.—Reflectogage is used to check blade thickness throughout its entire length

Spinning Specialists



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LETTERS *to the Editors...*

Get Your Reprints

We would greatly appreciate your sending us tear sheets of "Cutting Tool and Die Materials" feature sections published in your issues of August 16, 23, 30, September 6, 13, 27 and October 4. Congratulations on a job very well done which needed doing for a long time.

C. S. Bushnell, Chief Engineer
General Railway Signal Co.
Rochester, N. Y.

Reprints of the Guide to Cutting Tool and Die Materials are available for $1.00 from STEEL's Readers Service Department — The Editors

Address Dept.

In the August 23 issue of STEEL there appeared on page 110 a short article dealing with a process for the impregnation of steel and iron with pure aluminum by Linden & Co., Los Angeles, Calif.

Since we are very much interested in obtaining more information concerning this process and the products resulting from it, we would greatly appreciate it if you could supply us with the complete address of this concern.

Clifford L. Sayre
Special Projects Dept.
Buffalo Electro-Chemical Co. Inc.
Buffalo, N. Y.

Complete address of Linden & Co. is 901 North Westbourne Drive, Los Angeles 46, Calif.—The Editors

First Hand Report: European Steel Situation

I have just returned from a business trip to Europe and consequently have not yet caught up with all of the accumulated reading matter that my secretary thought I might be interested in upon my return. However, I have read your editorial in Steel entitled "Tight Period Ahead". One of the points you make in this editorial is regarding the possibility of using foreign tonnage for Marshall Plan steel. You stated, "As iron and steel output abroad improves, it may be possible to substitute some foreign tonnage for Marshall Plan steel from the United States or even to increase the trickle of ferrous materials now coming to our shores from dollar-needful European nations".

There are many things that I was astounded to find in my travels through France, Switzerland, England, Belgium and Holland. But the most astounding was the fact that every steel plant that I visited is ready to produce at 100 per cent capacity. Furthermore, I visited steel plants that are actually producing at 100 per cent capacity, as for example a French plant northwest of Paris. This is a 1000-ton-per-day plant. However in going through this plant one of the things that struck me was the exceedingly large percentage of their material that was going out in the shape of bent wide flange channel. I asked them what they were used for and I was told that this item was one of their largest tonnage items and that it is used entirely in coal mines as mine props.

In other words, while we in this country for the most part have been using wood pit props or, as I understand it, in some cases concrete construction is used, the French use steel throughout the operation. Furthermore, my observation, driving from Montbard in the southeast to Valenciennes to the northwest, is that there is a tremendous amount of standing timber available in France if it were only used. Naturally much of this is in their national public parks, but if there is a national emergency there certainly is no reason why some of it should not be used to help out in the national emergency.

Steel plants in Switzerland also are producing at 100 per cent capacity. One of these plants I visited, because they had purchased five of our machines, has expanded so that they can produce twice the tonnage of cold finished steel. This is a completely integrated producer in the sense that they produce all their steel products from raw material in the shape of scrap. They do their own melting, rolling, and so on. The director general of this plant told me that he was very much worried about where they would sell the output of their new plant now that they have it built and in operation. They are particularly worried because they cannot sell in those areas where they formerly exported steel—namely to France, Holland, Italy, Spain, and so on.

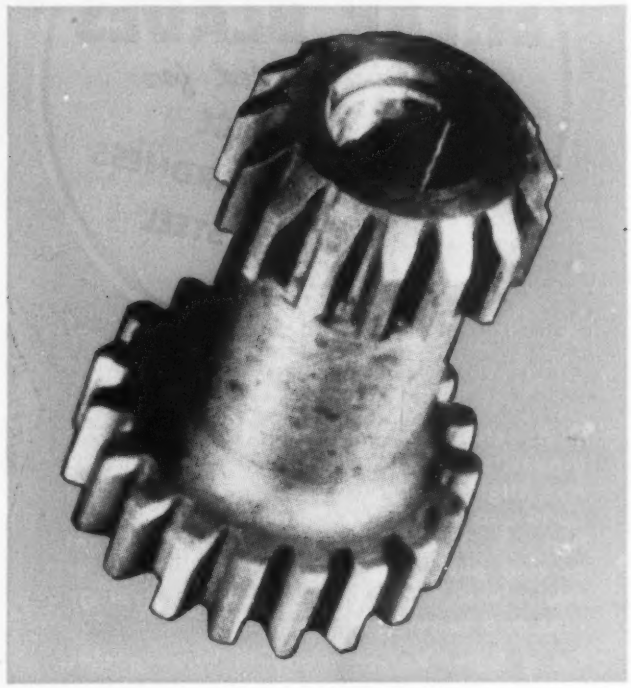
I told them I coudn't understand this because the New York Herald-Tribune had just published the statement that we have exported some, as I recall it, 228,000 tons of steel to Sweden. I knew that we did not like to do this and therefore why didn't the Swiss sell steel to Sweden. The answer I got was that Sweden never has been an importing country as far as steel is concerned and that every pound of steel that the United States furnished to Sweden really passed right on to Russia. There was so much consternation about this article that the director general asked me to let him copy it so that he could take it up with his board of directors.

The most astounding discovery I made was in Belgium. I went to visit one of our customers there to see a Medart bar straightening machine in operation. They took me all through their plant. They do not produce the steel they use—in other words they purchase all of their raw material in the form of hot rolled bars and other shapes. They forge track spikes, plates, track bolts, and they manufacture all types of threaded bolts and so on. They also have a tremendous cold finishing department. As a matter of fact this is their largest operation. It is a plant as large as the largest cold finishing plant in the United States. In going from one of the bolt departments into the cold finishing plant, we passed through their bar storage building.

When I got into this building I exclaimed that I never had been in the presence of so much steel since before the war. This did not bring any remark from anyone so I repeated it, and then my friend asked me if I was really complimenting him. I explained I really meant what I said, that I hadn't seen so much steel in one place since before the war. He then replied by saying that they did not consider it any more than a bare necessity because it was only a 90 days' supply to operate their plant at full capacity. I told him if I could get enough pig iron, or enough steel bars into my plant to operate 10 days in advance at all times, I felt fairly good—that I had been required to shut down our gray iron foundry twice during '48 because we had no pig iron. I then went into their cold finishing department and I was astounded again because here was a collection of steel that amounted to one-half of the total tonnage in their raw material stock. In other words they had 45 days' production in finished goods and 90 days' raw material on hand. Where, then, is there such a dire need for steel on the European continent?

The payoff really came that evening when I was the guest of the chairman of the board of directors of this plant. I told him that I had been exceedingly interested in his whole plant and that he really had a very fine layout. This is a fact, although some of the operations are rather old. Nevertheless they were producing and are in a position to increase production without buying a single piece of equipment. I also complimented him on having such a fine stock of raw material and finished goods on hand. He immediately made the statement that he and his asso-

How TIMKEN® forging bars help you cut production costs ...improve your forgings too



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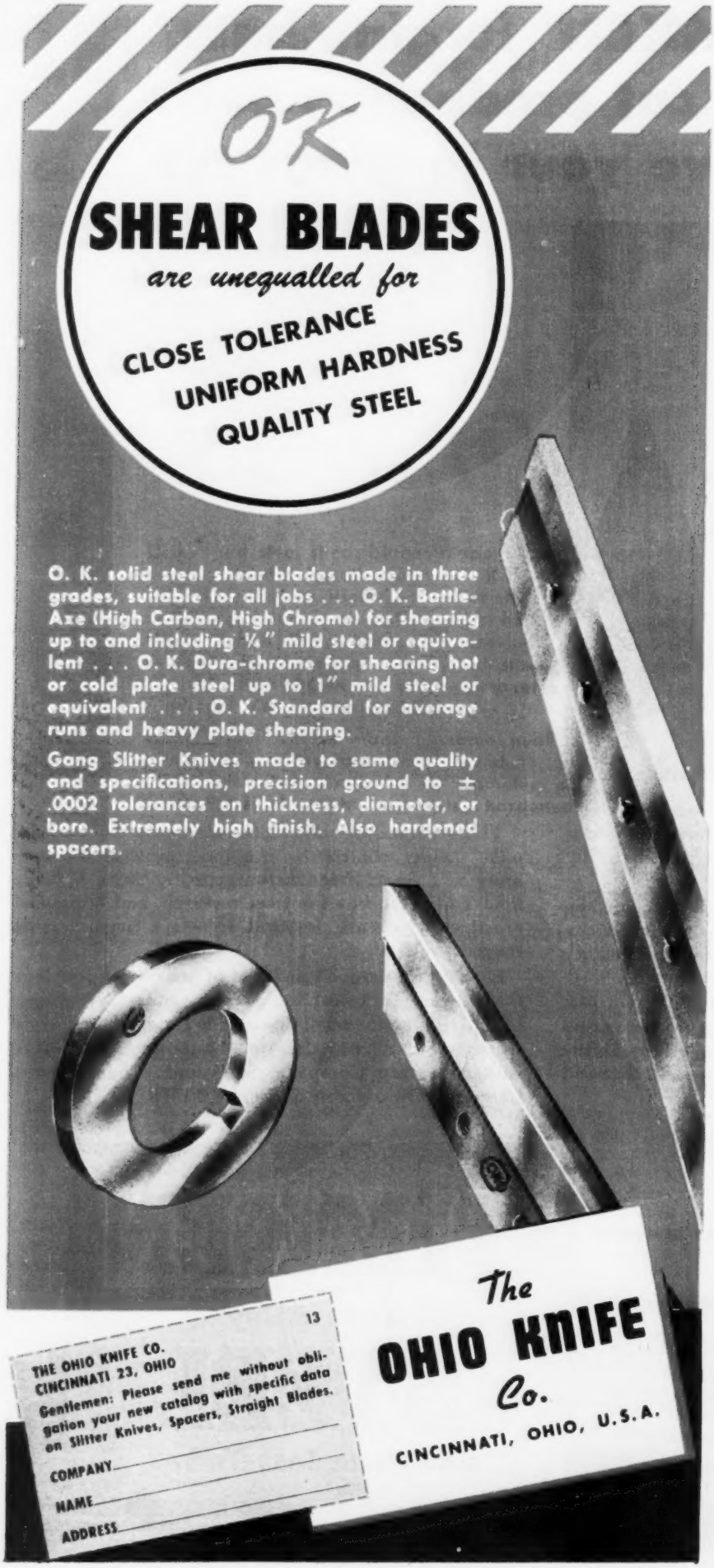
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ciates were very much concerned about the outlook of the future because they were only exporting 50 per cent of the amount they were exporting before the war. Naturally I took advantage of the situation and said to him that I knew there were plenty of places in the world where he could export and sell all his stock on hand, if he wished to do so, and immediately named South America as a big area, and I said certain parts of Canada would buy his goods, and many other parts of the world. He replied that the difficulty with all of these markets I mentioned was that they did not have any money, meaning of course that the would-be purchaser could not get the exchange they required and he stated in the same breath that they would not sell on credit.

I did not get into any steel plants in England because my plans were interrupted. I was scheduled to go to Sheffield and visit a steel plant there. However, I did visit scrap yards in England and therefore I know that there is no shortage of raw material as far as these scrap yards are concerned. All of them were well filled. Furthermore, the port of Southampton has many tons of scrap in the shape of submerged and partially submerged vessels.

I got into Germany and I went to meet those government officials of ours and those "Members of Investigating Scrap Missions" that went to Germany and have them tell me that the scrap there is not readily available. I went by rail from Basel to Frankfurt and I saw a carload of scrap for every mile of railroad, lying all within sight of the railroad line. There is so much scrap that the roads must be detoured around some of it. Furthermore, every large rail terminal, such as Leipzig and so on, wherever there are sidings, is filled with locomotives, most of which are only scrap, broken down railroad cars, and so on and so on, that were assembled at these points. Naturally all of this is in the American Zone. I did not go into the British Zone although I passed through the French Zone. The French Zone is very similar to the American Zone in this respect.

The man on the street in Switzerland asked me, "What is wrong with you Americans that you insist on giving all of your goods away?" After a person spends two weeks in Switzerland he has a great respect for their opinion and I agree there is something wrong with we Americans when we insist on giving our goods away to the people I visited.

Walter Siegerist, President
The Medart Co.
St. Louis, Mo.

P.S.—One of the Swiss brass mills let me see their scrap pile in order to show me the U. S. brass artillery shell cases they bought in the Philippines. W.S.

HALF

p·H control

Half of this message has to do with NORTHWEST products and processes for chemically cleaning ferrous and non-ferrous metals preparatory to plating, vitreous enameling, painting, etc., each problem involving a specific programing of one or more of the thirty-five standard NORTHWEST Cleaning Compounds including Electrolytic, Immersion, Solvent, Spray, and Water Wash types . . . the "Lo-Hi" pH process of chemically cleaning metals, preparatory to plating, porcelain enameling, etc., makes practical a control that management can plan on in these departments regardless of the type of metal or soil . . .

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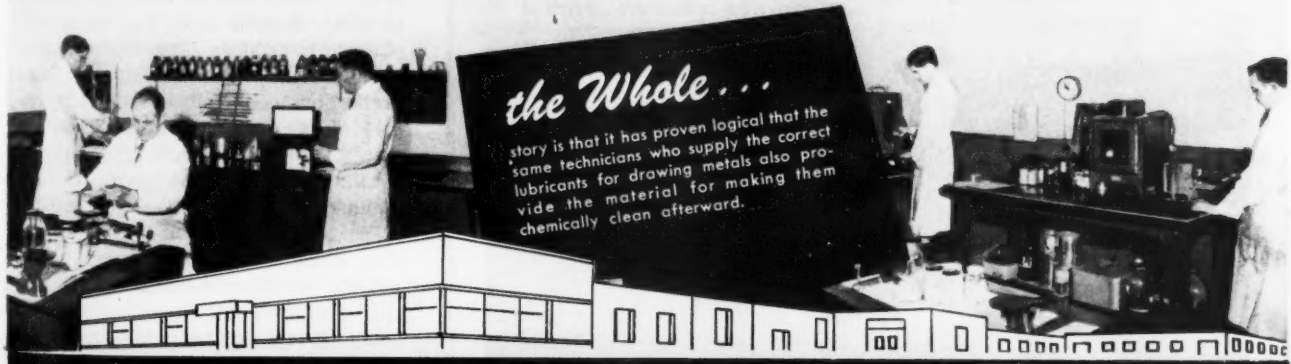
is concerned with metal forming lubricants developed for ferrous and non-ferrous metals in both pigmented and non-pigmented form . . . SUPERDRAW products are specifically compounded for: 1. Brass and Brass Alloys, 2. Cold Rolled Steel, Enameling Iron, Stainless Steel and Aluminum, 3. Alloys of Steel, Aluminum and Copper . . . SUPERDRAW compounds will handle light, medium, and heavy operations . . . may be applied by brush, roller, spray, or dipping . . . A request on your letterhead will bring a technician to consult you on your drawing and cleaning problems . . .



the Whole . . .

story is that it has proven logical that the same technicians who supply the correct lubricants for drawing metals also provide the material for making them chemically clean afterward.

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- Steel ☐ Brass ☐
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- Pgtd ☐ Non-Pgtd ☐

Forging Practice

(*Concluded from Page* 71)

than do forgings after they have been hardened and tempered. The cutting tools do not dull or wear out so fast, which allows more pieces to be machined between tool grindings. The production rate on normalized or annealed parts is usually higher. Disadvantages in heat treating parts after machining, by hardening and tempering is the possibility of warpage, of slight size changes and chances of a scaled surface. In some cases, a grinding follows the heat treatment to correct any irregularities caused by the heat treatment.

In general, it may be said that a heat treatment by hardening and tempering can follow the machining operations where the forging is of a chunky nature that is not readily warped by a heat treating operation, where the assembly tolerances are not very close, where a discolored or slightly scaled surface is not of importance, where the final hardness is quite high, over 300 BHN, or where a grinding operation follows the heat treatment. Shape of the part and the machining involved must be given due consideration.

Warpage Eliminated—Forgings machined in the hardened and tempered state retain the sizes and tolerances given to them by the machining operations. Chances of warpage, size changes, scaled or discolored surfaces, damage to fine machine work such as close tolerance threads, and ragged surfaces due to softness are eliminated by machining after heat treatment. There is a lesser tendency towards cracking on unmachined forgings because the unmachined forgings usually do not have the sharp corners obtained in machined parts.

Where parts are cracked in the unmachined condition, they do not lose expensive machine work. Long parts are usually straightened more easily in the unmachined condition than in the machined condition because straightening marks do not spoil the unmachined part so easily. Machining operations are always slower on hardened and tempered forgings, particularly in the higher hardnesses, and it is necessary to use modern heavy duty equipment which has the necessary rigidity to perform the machining operations satisfactorily. Tool dressings are more frequent in machining hardened and tempered parts, but modern carbide-tipped tools have helped in machining heat-treated parts.

Experience of many kinds of machining operations on a large variety of forgings seems to indicate that it is not possible to offer a general rule to be followed. Some parts are machined more satisfactorily in the tempered state and then hardened and tempered, considering overall economy. Many other forgings should be heat treated first and then machined to obtain the most satisfactory results. Shape of the part, grade or composition of material used, scope of the machining requirements, type of machining equipment available, hardness at which the machining is to be performed, quantity of parts to be machined, type of cutting tools to be used, design of the holding fixtures, tolerances required and experience of the personnel are some of the factors that enter in sequence of the machining operations and in specifying machining in the soft or heat treated state.

(*To be concluded*)

—o—

Tournalayer Division, Longview, Tex., of R. G. Tourneau Inc., has introduced a 45,000-pound (gross vehicle weight) vehicle designed to haul long, heavy loads such as pipe both in on-road and off-road operations.

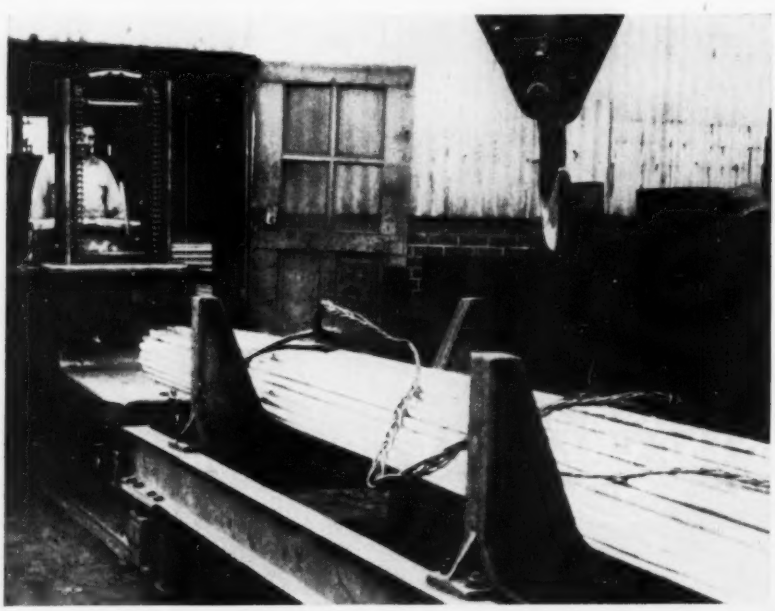
Transfer Technique

Cuts Construction Cost

ASSIGNMENT of a battery-powered high-lift platform truck to an additional operation for a period of approximately 2 hours per month saved an estimated $10,000 in construction costs when a new department was set up in the Etna, Pa., Works, Spang-Chalfant Division of National Supply Co. Originally it was planned to extend the runway of an overhead crane in order to transport incoming coupling pipe stock to storage, but engineers found a simple way of saving both the time and expense of construction.

One end of a 30-foot transfer track was run into the yard area and the other under the craneway inside the building. A locomotive yard crane lifts 2-ton sling loads of pipe from gondola cars to the transfer car parked on track. Load is pulled inside the building by the battery powered truck, as shown in the accompanying illustration.

Overhead crane picks up the sling load and moves pipe to proper storage area and the transfer car is pushed outside by the truck for another load. Elapsed time for transfer of about 50 tons of pipe is approximately 2 hours. Supplies are received about once a month. Photo courtesy Electric Industrial Truck Association.



Powder Metallurgy

(*Continued from Page* 80)

sure uniformity, certain closely interrelated variables in powders must be carefully controlled. Among these are apparent density, screen analysis, compressibility, flow rate, chemical analysis, particle shape and structure. Tests for these properties are gradually becoming standardized by the Metal Powder Association.*

Uniform particle size is a prime requisite. Manufacturers usually specify this in broad terms such as "100 per cent through 100 mesh", or "50 per cent through 325". Metal powder is classified between shot (particles of metal closer than 10 mesh**) and colloids (with particles usually less than 0.1-micron). Since powder metallurgy is concerned with surface phenomena, powders larger than 100 mesh have no particular value in the process except in the manufacture of porous filters.

Particle size distribution is a numerical frequency or weight percentage in which every size of particle exists. For metal powders finer than 10 mesh (diameter 2000 microns) and coarser than 325 mesh (diameter 44 microns) particle size distribution can be determined by passing the sample through a succession of testing sieves of increasing mesh number.

Other methods of determining particle size and the size distribution are: Microscopic count of particle diameters of about 0.3 micron and lower; sedimentation and elutriation (100 to 5 microns, usually); sedimentation balance; pipette, hydrometer, manometer and turbidimetric methods, x-ray diffraction.

Application of the electron microscope to the determination of particle size makes it possible to measure particles from 5 millimicrons to 1 micron.

One example of laboratory instruments based on Stokes' Law*** is the Roller air analyzer. This equipment provides a means of obtaining appropriate air velocities and overcoming agglomerating tendency of fine powders. Air is passed through or over the powder sample at the settling velocity of the coarsest par-

* Following standards of the Metal Powder Association are available:
M.P.A. Standard 1-45 — Method for Sampling Finished Lots of Metal Powders.
M.P.A. Standard 2-45—Method for Determination of Hydrogen Loss of Iron Powder.
M.P.A. Standard 3-45—Method for Determination of Flow Rate of Metal Powders.
M.P.A. Standard 4-45—Method for Determination of Apparent Density of Metal Powders.
M.P.A. Standard 5-46T—Tentative Method for Sieve Analysis of Granular Metal Powders.

** Particle is fine enough to pass a sieve with ten openings in a lineal inch of warp or woof.

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The skill and patience of craftsmen that execute miniatures often compares but never attains the degree of detail . . . comprehensive detail that is required of the craftsmen who mold dependable steel castings.

For example, at Unitcast, operation of the "Sand Control" system is just *one* of many comprehensive details that only reflects in the quality of the product. During each operating hour, constant vigilance and continual testing is necessary to control the many, many elements that mix good molding sand. Such items as moisture, permeability and the like *must* be held within definite limitations to produce Unitcastings efficiently. Differences in design between incoming and outgoing jobs on the molding line upset the immediate standards and the unusual jobs require special mixtures.

Yet, it's all in the day's work. With Unitcastings, like model making, painstaking time and patience have established long records of proven standards that assure Unitcast's customers the benefit of efficient casting procedure. Take advantage of Unitcast's proven experience . . . for your next job specify Unitcastings! Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio.

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ticle in the finest fraction to be obtained. All particles finer than the arbitrarily selected coarse limit of the fraction are floated out and collected. Velocity of the air is then increased to the velocity of the coarsest particle desired in the next fraction and so on.

A few of the particle shapes encountered in powder metallurgy are shown in some of the accompanying illustrations. Method of manufacture generally determines the shape of metal powder particles. Aluminum powder made by granulation is different from that produced by stamping. Reduced copper powder is different than electrolytically deposited powders of the same metal.

Production of Powders — Metal powders, raw material of the industry, possessing their own peculiar density, shape and size distribution are produced by many different methods, both mechanical and chemical. Very fine powders can be made by reducing metallic oxides of iron, cobalt, copper, nickel, tungsten and molybdenum in hydrogen or other reducing atmospheres. This pulverization method is the commonest used, with excellent and consistent results. By controlling the reduction conditions, a variation in particle size can be obtained.

Some metals, such as titanium, tantalum, zirconium and vanadium form hydrides of 300 mesh or finer which can be used directly as powder additions, or gradually decomposed by heating in a vacuum or nonoxidizing atmosphere above 350° C to form metal powder and hydrogen. Hydride powders (group IV of the periodic table) are prepared by mixing the metal oxide with calcium hydride, charged into a special hydrogen furnace and heated to 600 to 1000° C. At the end of the heating cycle, the charge is cooled to room temperature and then broken up in jaw crusher to small lumps. This facilitates subsequent dilute acid treatment to remove the lime. Product of the reaction is fine powder—1 to 5 microns. Since it combines with and removes all traces of oxide, nascent hydrogen, released during sintering has been found to have a beneficial effect upon the boundary phases of the finished part.

By electrolytic processes, iron, copper, silver, tantalum and manganese powders, dendritic in shape, and of very high purity, can be produced. Iron and copper are particularly adaptable to the electrolysis process in which the metal is deposited at the cathode, either as a thin sheet which is subsequently ground to powder, or directly as a powdery crystalline deposit. Final step in this procedure is washing and drying. Electrolytes usually consist of a sulphate with or without chloride.

Atomization is one of the cheapest methods used to produce fine particles of lower melting point metals, brass, aluminum, tin, zinc, lead and solder and copper-lead. Most simple atomizing setup consists of a crucible from which the molten metal is poured, through a nozzle, to be disintegrated by high pressure air, steam or water. By changing fall in pressure of the atomizing stream, temperatures of metal and orifice dies, size and shape of the particle can be controlled. Atomized powders are always irregularly shaped, fairly uniform in size and possess good density.

Hard, brittle metals and even malleable metals can be pulverized by crushing or milling. Special equipment for this purpose includes ball, stamp, eddy, and impact mills and disk crushers. Materials such as antimony, silicon and bismuth, and hard metals, chromium, molybdenum and manganese are milled easily; copper, aluminum and brass require the addition of lubricants to keep particles from sticking to each other. Flaky powders are more generally useful as pigments than in powder metallurgy processes.

Nickel and iron particularly, and several other metals, readily combine with carbon monoxide to form metallic carbonyls which can be converted readily into powder. The small, spherical particles are very pure chemically. Powders produced by this method sinter at very low temperatures; in fact, sintering is reported to occur even without the aid of compression.

TENTATIVE LIST OF CURRENT PRICES OF SOME METAL POWDERS

Metal	Per Lb.
Aluminum	28c to 35c
Aluminum Alloys	33c to 42c
Brass	26½c to 36½c
Chromium	$1.51 to $2.26
Iron	11c to 90c
Manganese	70c to $1.00
Molybdenum	$6.50 to $9.00
Nickel	59c to 83c
Stainless Steel	$.75 to $1.35
Tin	$1.29 to $1.64
Titanium	$10.00 to $12.00
Tungsten	$3.25 to $7.50
Zinc	31½c to 41½c
Zirconium	$10.00 to $12.00

Courtesy Charles Hardy Inc., New York.

ACKNOWLEDGEMENT

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American Steel Foundries, Elmes Engineering Works, Chicago
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E. W. Bliss Co., Detroit
Buel Metals Co., Painesville, O.
Callite Tungsten Corp., Union City, N. J.
Fred S. Carver Inc., New York
The Drever Co., Philadelphia
The Electric Furnace Co., Salem, O.
General Electric Co., Schenectady, N. Y.
Handy & Harman, New York
Charles Hardy Inc., New York
Hydraulic Press Mfg. Co., Mount Gilead, O.
Hydropress Inc., New York
International Nickel Co. Inc., New York
Kux Machine Co., Chicago
Lake Erie Engineering Corp., Buffalo
Metals Disintegrating Co. Inc., Elizabeth (B), N. J.
Metal Hydrides Inc., Beverly, Mass.
Metals Refining Co., Division of Glidden Co., Hammond, Ind.
National Engineering Co., Chicago
W. S. Rockwell Co., Fairfield, Conn.
Sintercast Corp. of America, New York
Standard Machinery Co., Providence, R. I.
F. J. Stokes Machine Co., Philadelphia
United States Metals Refining Co. subsidiary of American Metal Co. Ltd., Carteret, N. J.
Watson-Stillman Co., Roselle, N. J.
Westinghouse Electric Corp., Pittsburgh

BIBLIOGRAPHY

Ornan B. Smart, "Powder Metallurgy", PB 81841, Office of Technical Services, Department of Commerce, Washington, D. C.

Irving J. Donahue, "Some Considerations in Designing Parts for Powder Metallurgy", *Mechanical Engineering*, Nov., 1946, p. 949

Paul Schwarzkopf, *Powder Metallurgy, Its Physics and Production*, The MacMillan Co., New York, 1947

Laurence Delisle and Aaron Finger, "Nickel-iron Alloys Produced by Powder Metallurgy", Technical Publication No. 2046, American Institute of Mining and Metallurgical Engineers, Aug., 1946

Norbert K. Koebel, "Sintering Atmospheres Used in Powder Metallurgy", Fourth Annual Spring Meeting, Metal Powder Association, April 15, 1948

W. Wirt Young, "Sintering of Powdered Metals", Information Letter No. 21, Metals Committee, American Gas Association, New York

Henry H. Hausner, "Metal-Ceramics, A New Field in Powder Metallurgy", fourth annual spring meeting, Metal Powder Association, April 15, 1948

B. T. DuPont, "Fundamental Facts about Iron Powder Costs", Proceedings, Second Annual spring meeting, Metal Powder Association, June 13, 1946

Symposium on Powder Metallurgy, Special Report No. 38, The Iron and Steel Institute, 4 Grosvenor Gardens, London, England, 1947

Henry H. Hausner, *Powder Metallurgy Principles and Methods*, Chemical Publishing Co. Inc., Brooklyn, N. Y., 1947

H. M. Webber and A. G. Hotchkiss, "Furnace Atmospheres for Sintering", Proceedings, second annual spring meeting, Metal Powder Association, June 13, 1946

John D. Dale, "Stainless Steel Powder", Preprint for spring meeting, Metal Powder Association, May 27, 1947

Lawrence H. Bailey, "Machinery for Compressing Powdered Metals", Powder Metallurgy Conference, Massachusetts Institute of Technology

Robert Steinitz, "Resistivity Measurements on Iron and Steel Compacts", *Powder Metallurgy Bulletin*, Vol. 1, Jan., 1946, p. 6

H. Christensen and C. J. Calbick, "Sintering Process Study by Electron Micrography", American Physical Society, Washington meeting, April 29, 1948, reported in *Powder Metallurgy Bulletin*, Vol. 3, No. 3, May, 1948, p. 62

G. Benjamin Smith, "Compressibility Factor

*** Stokes' Law, which relates the terminal velocity of fall of a spherical particle to its diameter, is as follows:

$$V = \frac{10^{-8}\ g\ P\ d^2}{18\ n}$$ where

V = terminal velocity of fall in cm/sec in a stationary fluid
g = constant of gravitation in cgs units = 980
P = density of particle in g/c.c.
n = Viscosity of fluid in cgs units = 1.82 x 10^{-4} for air
d = Diameter of sphere in microns"

Therefore,

$$V = \frac{10^{-8} \times 980 \times P \times d^2}{18 \times 1.82 \times 10^{-4}}$$

$$V = .00299\ P\ d^2\ cm/sec.$$

for Metal Powders", preprint for fourth annual spring meeting, Metal Powder Association, April 15, 1948
James J. Kux, "Machines Used for Forming Powdered Metal Parts", American Society of Mechanical Engineers, symposium on powdered metal parts, Feb. 26, 1945
Walter E. Dalby, "Tooling for Powdered Metal Parts", preprint, fourth annual spring meeting, Metal Powder Association, April 15, 1948
A. J. Langhammer, "Bearings, Bushings and Allied Products", proceedings, third annual spring meeting, Metal Powder Association, May 27, 1947, p. 32
Walter J. Baeza, *A Course in Powder Metallurgy*, Reinhold Publishing Corp., New York, 1943
E. C. Truesdale, "Apparatus for Air Classification of Metal Powders", proceedings, Third annual spring meeting, Metal Powder Association, May 27, 1947, p. 35
Laurence Delisle and Walter V. Knopp, "Nickel Steels by Powder Metallurgy", technical publication No. 2340, American Institute of Mining and Metallurgical Engineers, New York meeting, Feb., 1948
Pol Duwez and Howard E. Martens, "The Powder Metallurgy of Porous Metals and Alloys Having a Controlled Porosity", Technical Publication 2343, American Institute of Mining and Metallurgical Engineers, New York meeting, Feb., 1948
Robert Talmadge, "The Sintering of Metal Powders", American Gas Association Sales Conference on Industrial and Commercial Gas, Windsor, Ont., April 7-9, 1948

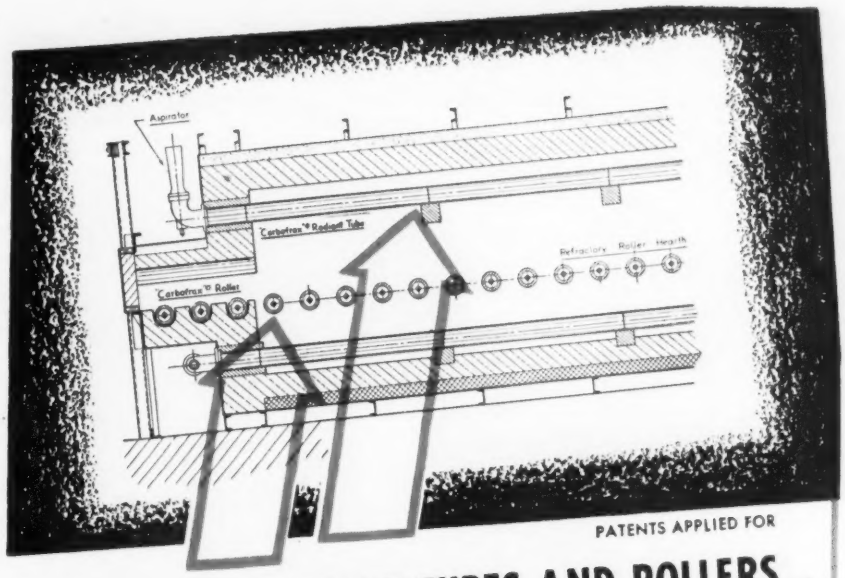
Bulletin Describes Alloy Tubing Properties

New data, developed during the last 6 years, on the properties and behavior in service of Croloys and other tubular materials are presented in technical bulletin No. 6-E, "Properties of Carbon and Alloy Seamless Steel Tubing for High Temperature and High Pressure Service". Published by Babcock & Wilcox Tube Co., Beaver Falls, Pa., the bulletin omits steel compositions in the development stage, listing only those that have earned themselves a place in the list of high temperature tube steels from the standpoint of utility and economy.

Included in the 145-page, profusely illustrated book are sections on the influence of various alloying elements, chemical composition, room temperature and short-time tensile properties, creep testing, thermal conductivity, air hardening properties and a resume of applications. Graphs, photomicrographs, line drawings and bibliographies are widely used.

—o—

General Electric Co., Schenectady, N. Y., has equipped its popular sizes (from one to 20-horsepower) of totally enclosed, fan-cooled motors with newly developed, corrosion-resistant Textolite cooling fans. This material, which is relatively inert to most corrosive atmospheres and is nonsparking, is reported to widen the motors' use in chemical and allied industries and in the presence of hazardous dust or gas.



PATENTS APPLIED FOR

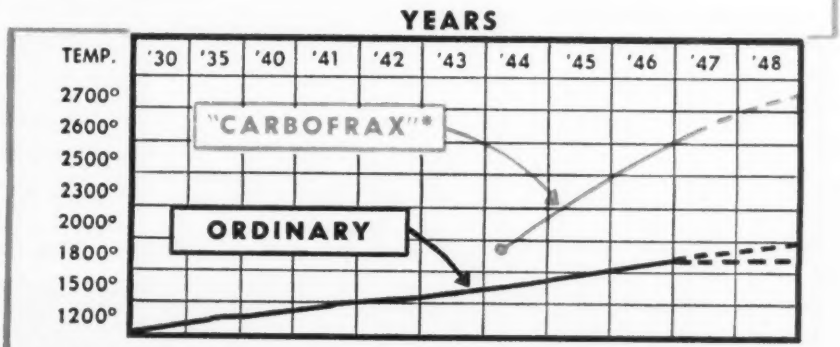
NEW TYPE RADIANT TUBES AND ROLLERS.. REDUCE HEAT TREATING COSTS PROVIDE CONTROLLED ATMOSPHERES UP TO 2500° F. WITH GAS HEAT

"CARBOFRAX"* Radiant Heating Tubes and Rollers are not only reducing heat treating costs in conventional furnace operations — but also achieving temperatures up to 2500° F. in special and protective atmospheres with radiant gas heat.

Laboratory tests and actual plant operation prove these outstanding advantages of "CARBOFRAX"* Tubes and Rollers in GASMACO Industrial Furnaces:

- Lower initial cost—longer life
- Operation up to 2500° F.
- High heat transfer and fuel efficiency
- High hot load strength without oscillation
- Freedom from "crankshafting"
- Gas-tight operation
- Low heat loss through insulated water cooling

We shall be glad to send you complete information or arrange for an engineer to call.



Development of high operating temperatures with "CARBOFRAX"* as compared with ordinary tubes and rollers. Because these high temperatures are economically practical, new fields are being opened in heat treating with gas fired roller hearth radiant tube furnaces.

*"CARBOFRAX" is a registered trade-mark indicating manufacture by the Carborundum Company.

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THE GAS MACHINERY Company

Designers and Fabricators of Industrial Heating and Handling Equipment • Manufactured Gas Plants and Special Equipment

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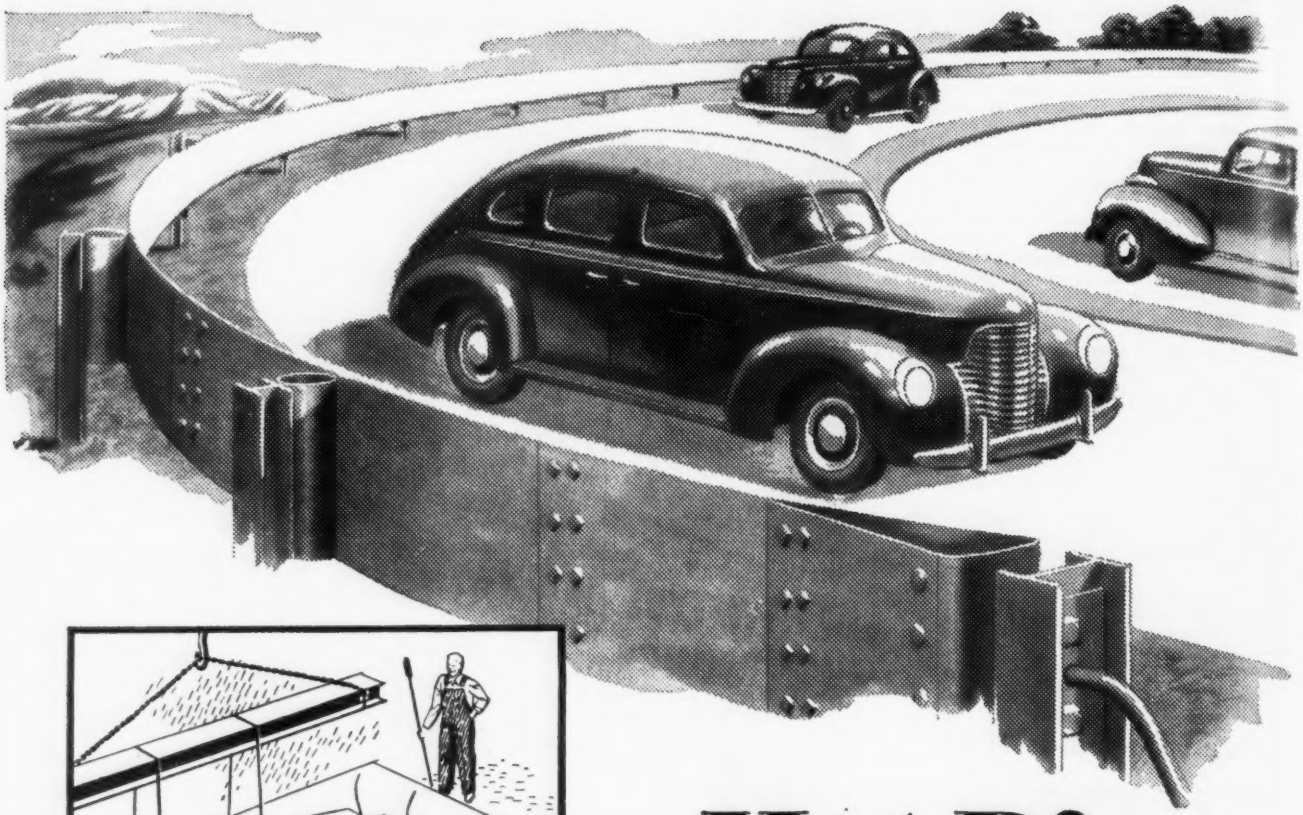


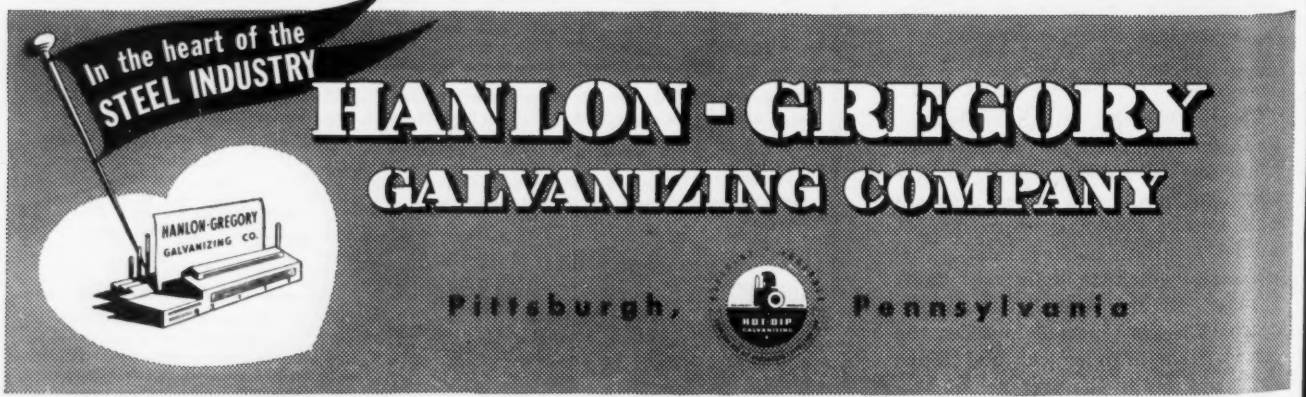
Hot-Dip Galvanized Guard Rail *Lasts Longest*

Hot-Dip Galvanizing by the Hanlon-Gregory method provides the utmost in rust prevention for any exposed iron or steel installations.

Hot-Dip Galvanizing by Hanlon-Gregory will give *your* products or installations greater uninterrupted service, and will save you expensive replacement and maintenance costs.

The World's Largest Job Galvanizing Plant —located in the heart of the steel industry— is equipped to provide *for your products* this time-proven protection against rust—regardless of their quantity.

THE WORLD'S LARGEST JOB GALVANIZING PLANT

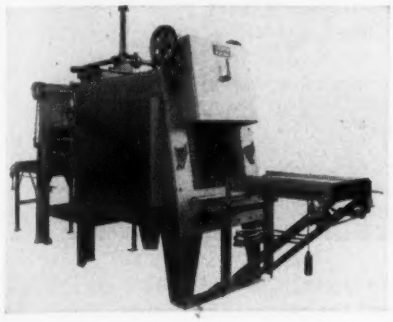


GALVANIZING . . . PICKLING AND OILING

New Products and Equipment

Atmosphere Furnace

Lindberg Engineering Co., 2444 West Hubbard St., Chicago 12, Ill., is announcing an all-purpose controlled atmosphere furnace. It is suitable for hardening both high speed and air hardening steels, as well as brazing and sintering operations. Built to



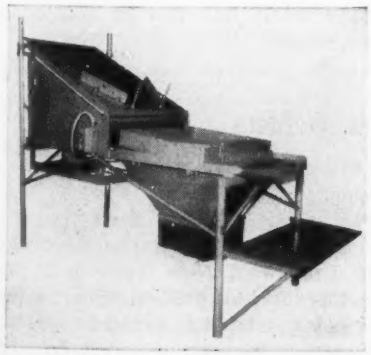
operate at temperatures to 2500°F, it is heated by Globar elements.

Fan of the propeller type is built into the top part of the cooling chamber to circulate the protective atmosphere, provided by a generator of the proper type for the work involved. Charge and discharge doors are operated by air cylinders.

Check No. 1 on Reply Card for more Details

Mechanical Separator

Parts are removed from chips or mixed chips may be separated into the various sizes with the Roto-Finish mechanical separator announced by Sturgis Products Co., Sturgis, Mich. It consists of a welded steel



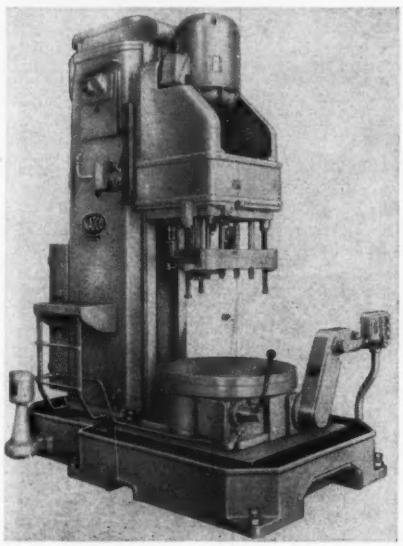
frame with an inclined surface on which is located a hoist pan serving as a hopper and a waist-high separating table which supports a mechanized shaker screen assembly. The inclined surface for the hoist pan support is adjustable for correct gravity flow of parts and chips onto the screen.

Height of the shaker screen assembly plus the reciprocating motion provided by the motor drive separates parts from chips and automatically discharges the former at the opposite end. Stroke of screen assembly can be changed by variable adjustment on motor drive. Motor drive can be either a 110 or 220-440 volt geared head ¾-horsepower motor. Separator can be used with either Roto-Finish CW-45 or CW-60 hoist pan. Screens measuring 32 x 27 inches are available.

Check No. 2 on Reply Card for more Details

Drilling Machines

Electrically controlled hydraulic feed system of the model C2A, C3A and C4A Holesteel vertical drilling, tapping and boring machines made by National Automatic Tool Co., Rich-



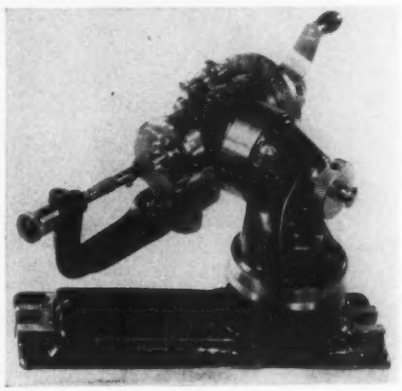
mond, Ind., provides an infinitely variable feed selection within the specified range. Models are of single spindle and fixed center multiple spindle construction. Each can be supplied with either a large base (suitable for rotating and sliding type fixture applications) or small base (for adjustable table applications or stationary fixtures).

Models C2A and C3A machines can be supplied with an adjustable knee type table. The entire assembly has a vertical adjustment of approximately 12 inches. The heavy box section column prevents deflection under heavy thrust loads. Upper section encloses the hydraulic pressure pumps and piping. Single spindle head is direct motor driven and antifriction mounted. Lever-operated sliding gears allow selection of seven speeds. Combination drilling and tapping heads are provided with an independent reversing type motor for the tapping spindle drives.

Check No. 3 on Reply Card for more Details

Grinding Fixtures

All the accurate positioning features of other model grinding and indexing machines built by All Tool Co., 111 Long Ave., Hillside, N. J., are included in the company's latest



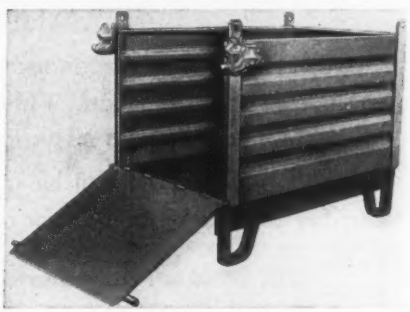
model B. It also has a special tail stock which is provided with a spring loaded adjustable center.

The arm is easily removed when not needed. Maximum distance between centers is 2¾ inches. Maximum diameter is 2½ inches. Use of the fixture eliminates the need for more expensive equipment for grinding small cylindrical work such as plug gages, taps, multisplines, etc.

Check No. 4 on Reply Card for more Details

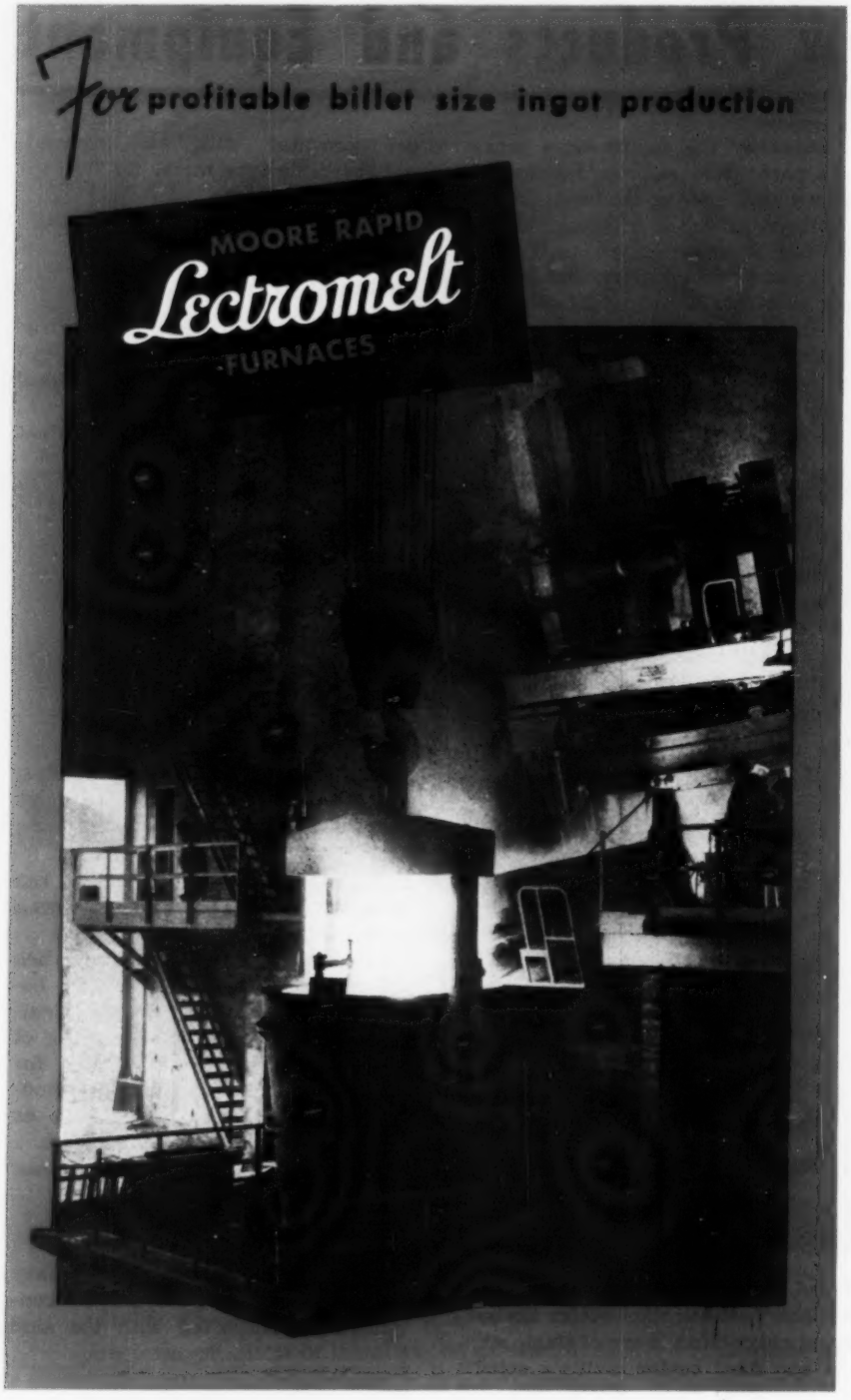
Skid Box

Scrap, castings and other heavy materials and products can be conveniently transported with the skid



box built by Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3, Pa. It is built of corrugated steel panels with double reinforced corner angle construction, rolled edge top and cast and forged steel latches.

Formed channel legs offer floor protection. The box itself is fabri-



Top-charging *Lectromelt* furnaces combine profit and quality in the production of billet size ingots. With a *Lectromelt* top-charge furnace you can increase production—and can use poorer grades of scrap.

Lectromelt furnaces are available in capacities ranging from 100 tons to twenty-five pounds. Write today for complete information.

Manufactured in

CANADA — Lectromelt Furnaces of Canada, Ltd., Toronto 2
ENGLAND, SWEDEN, AUSTRALIA — Birlec, Ltd., Birmingham, England
FRANCE — Stein et Roubaix, Paris
BELGIUM — S. A. Belge Stein et Roubaix, Bressoux-Liege
SPAIN — General Electrica Espanola, Bilbao
ITALY — Forni Stein, Genoa

PITTSBURGH LECTROMELT FURNACE CORP.

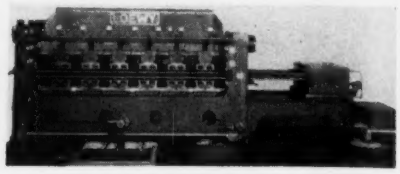
PITTSBURGH 30, PENNSYLVANIA

cated of Cor-Ten corrosion resisting steel. It can be used with lift trucks or crane and is available with various types of discharge doors and may be built to fit any size specifications.

Check No. 5 on Reply Card for more Details

Shearing, Trimming Lines

Equipment for production of flattened, edge-sheared and cut-to-length aluminum plate is being offered by Loewy Construction Co. Inc., Rolling Mill Division of Hydropress Inc., 570 Lexington Ave., New York 22, N. Y. There are two lines in the group, one



for ½-inch by 104 inches by 33 feet and the other 0.200-inch by 104 inches by 16 feet. Each line consists of feeding tables, backed-up type leveller, pinch rolls, edge trimmer, upcut shear and gage table.

On the heavy line, plates are loaded singly from pile by a vacuum lift unpiler and after being processed are removed singly by a similar piler. Edge trimmers are of the rotary shear type with knives that can be adjusted on two planes. All knife arbors, drives, etc. are antifriction mounted. Reciprocating guillotine scrap cutters are provided, operating from a separate drive motor so as to match scrap speed and chop the short lengths. Arrangement of knife head assemblies is such that machine can be used as a gang slitter. Each line has two operating stations from which whole line can be controlled electrically.

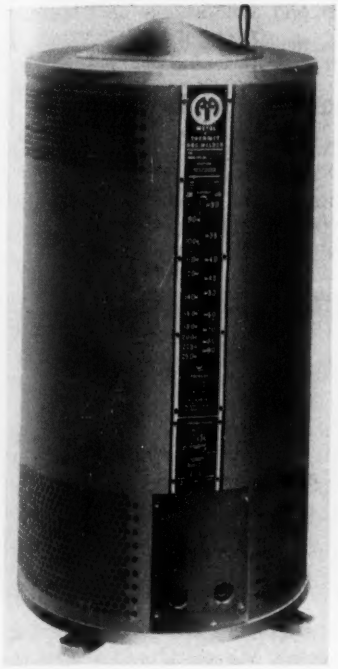
Check No. 6 on Reply Card for more Details

Arc Welders

Alternating and direct current arc welding machines in 150, 200, 300, 400 and 500-amp capacities are being built by Metal & Thermit Corp., 120 Broadway, New York 5, N. Y. Features include built-in power factor corrector, stepless current control, forced air ventilation, wide current range and moderate open-circuit voltage operation. Instant plug-in, plug-out of electrode leads by taper type connector is provided.

Lead interchange is avoided by a permanent work lead connection. Direct current models have a one-dial simplified control panel. Operator simply plugs into the proper outlet, then dials for any required minor adjustment in current. Motor driven

units are offered in 150, 200, 300 and 400 ampere capacities in the compact 3600 revolutions per minute model and in the conventional 1750 revolutions per minute type. Engine driven

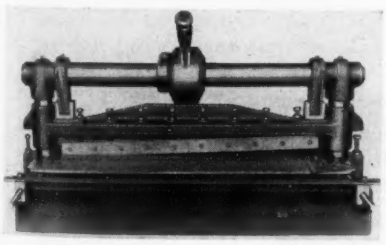


welders include 200 ampere units powered by air-cooled Wisconsin engines, and 300 and 400 ampere sets driven by Chrysler industrial engines.

Check No. 7 on Reply Card for more Details

Shear

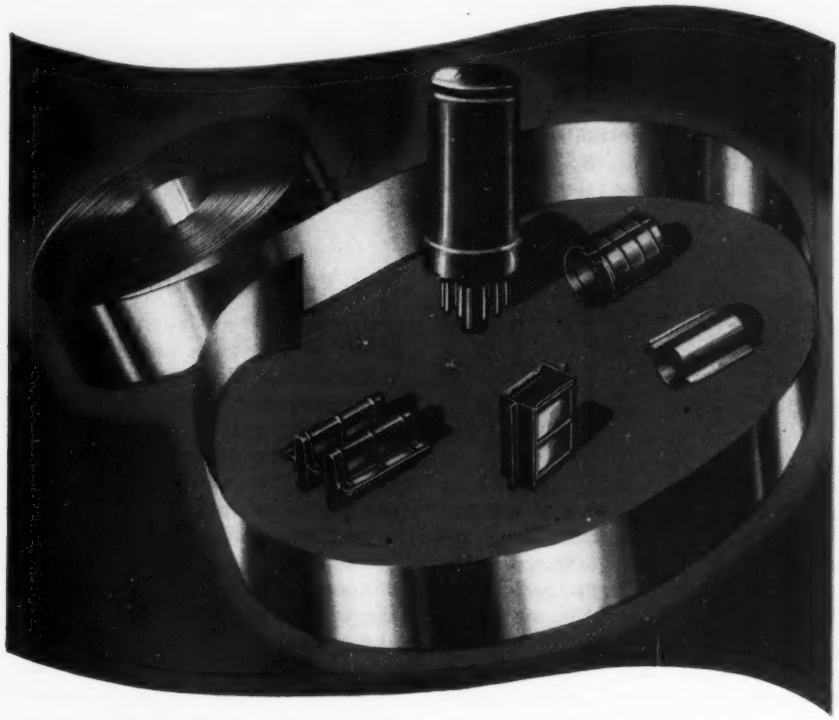
A wide variety of materials may be accurately and rapidly sheared with the Di-Acro shear No. 4, built by O'Neil-Irwin Mfg. Co., 304 Eighth Ave., Lake City, Minn. The cutting range extends from the lightest of



materials in plastics, mica, and rubber to heavy gages of aluminum, cobalt steel, chrome molybdenum, leaded brass and stainless steel. Maximum material capacity is 24 inches wide and 16-gage sheet steel or heavier gages of more ductile materials.

All materials are clean cut, free from rough edges. A gravity chute built into the heavy base casting delivers all materials sheared. A protracting gage for squaring and mitering can be quickly and accurately adjusted for any degree of angularity

specialized ThomaStrip . . .



reduces raw material costs in electronic applications

For many years Specialized ThomaStrip has been the means of reducing raw material costs in the Electronics Industry. More costly metals have been replaced by Cold Rolled Strip Steel, coated and uncoated, which specifications were developed through the co-operation of the Industry and The Thomas Steel Company. Most satisfactory results have been obtained as exemplified by their continued use.

Perhaps ThomaStrip may lower your costs or give you a better finished product—or do both. Thomas' engineers welcome the opportunity to try.

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COLD ROLLED STRIP STEEL SPECIALISTS

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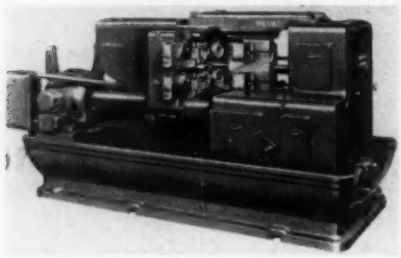
ELECTRO-COATED ZINC,
COPPER, NICKEL, AND BRASS...
HOT DIPPED TIN AND LEAD ALLOY...
LACQUER COATED IN COLORS...
UNCOATED PRECISION STRIP...
CARBON AND ALLOY SPECIALTIES

desired. The material gage can be mounted in back of shear for accurate sizing or on front for precision trimming of edges. All four blade surfaces have a shearing edge.

Check No. 8 on Reply Card for more Details

Spindle Automatic

Revisions in the 2-5/8-inch 4-spindle automatic screw machine made by Greenlee Bros. & Co., Rockford, Ill., include an overarm added which gives



the machine a more streamlined appearance and at the same time increases the rigidity of the spindle-carrier housing, thereby permitting use of heavier tooling. The main tool slide has been strengthened by addition of gibbed ways fastened to the overarm. A new Greenlee main clutch unit insures a positive feed for handling heavier cutting loads.

Four parallel mounted cross slides are actuated through a system of cams which are easily and quickly interchangeable. Other features include rapid adjustment of main tool slide stroke through use of a graduated worm-wheel, an easily accessible tooling area for quick set-ups and easy operating and standardized, interchangeable tooling. Work up to 8-3/16 inches in length can be handled.

Check No. 9 on Reply Card for more Details

Low Voltage Controllers

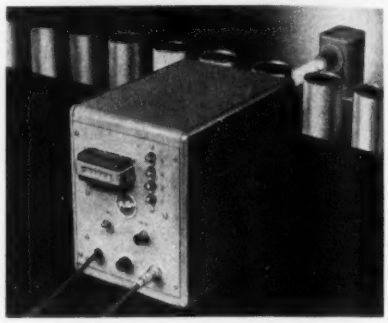
General Electric Co., Schenectady 5, N. Y., is offering a new line of low voltage controllers for use with alternating current motors up to 800 horsepower (at 550 volts) and for direct current motors up to 350 horsepower (at 230 volts). They are designed for controlling squirrel cage, wound rotor, synchronous or multi-speed alternating or direct current motors. Included in the one unit are the equipment needed to start, stop and control the motors, plus an integrated draw-out air circuit breaker.

Serving also as a circuit isolating device, this circuit breaker is designed so that it is readily interchangeable. When it is pulled out for inspection and test position, it is mechanically latched and disconnected from all power. Enclosures housing these controllers are 90 inches high and are factory assembled.

Check No. 10 on Reply Card for more Details

Photoelectric Counter

Counting rates up to 6000 per minute are possible with the model 310 photoelectronic counter announced by Potter Instrument Co., 136 Roosevelt Ave., Flushing, N. Y. It is a self-



contained unit including photoelectric detector, one electronic decade and a six-digit electromechanical register. Through the use of the electronic

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BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

HI-GRADE METALLIC

FAMOUS

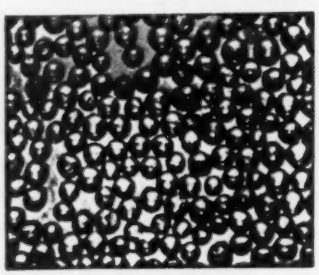
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

SHOT

- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

GRIT

- RECTANGULAR
- SHARP
- TOUGH
- DURABLE



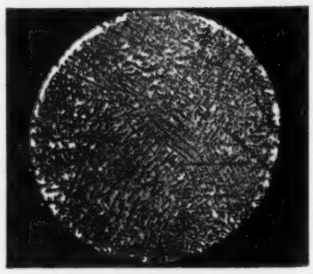
UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY

3896 LONYO ROAD

DETROIT 10, MICHIGAN

CEdar 7200



MICROSCOPIC STRUCTURE OF METAL

counter decade ahead of the electro-mechanical register, the counting speed of the mechanical counter is scaled down by a factor of 10, thereby increasing accuracy.

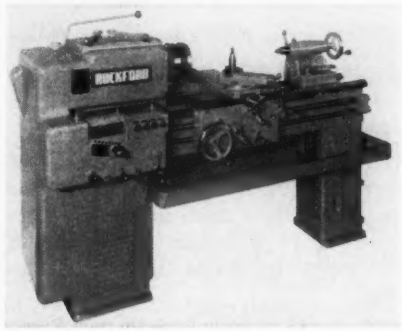
Last digit of the number is registered on neon glow lamps of the electronic counter decade and the rest of the digits are indicated on the mechanical register, providing a maximum registration of seven digits. Small objects and closely spaced objects can be counted as beam width is 1/4-inch and response is to light changes are small as 25 per cent. It is also available as model 311 counter for use in counting shaft rotations without physical contact.

Check No. 11 on Reply Card for more Details

General Purpose Lathe

Twelve spindle speeds, quickly adjustable means of levers, feature the Economy lathe introduced by Rockford Machine Tool Co., Rockford, Ill. Spindle has been made of high alloy steel forging, mounted on Timken zero-precision bearings, to insure maximum accuracy and long life. Spindle nose has a No. 1 tapered key drive. Headstock gears are cut from preheat treated steel gear blanks, annealed, hobbled and shaved.

Gear lubrication is by an immersion and oil-splash system. Overall design of headstock permits all types of lathe operations, including high spindle speeds and use of tungsten carbide cutting tools. Pick-off change



gears, reverse gears, V-belts and similar parts and assemblies are accessible for adjustment or repair through a hinged door on the headstock end of the lathe.

Check No. 12 on Reply Card for more Details

Contact Wheel

A contact wheel, developed by Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul 6, Minn., is designed for heavy grinding with abrasive belts at speeds of 10,000 surface feet per minute or more. Advantages cited are faster and cooler stock removal, lower production cost and chatter-free grinding.

Designated as the K wheel, it is made in 8 and 16-inch diameters, in face widths of 2, 3, 4 and 6 inches. It is for use with cloth belts coated with silicon carbide or aluminum oxide mineral grains. Reduction of grinding heat comes from use of the wheels, minimizing loading and glazing of the belt.

Check No. 13 on Reply Card for more Details

Squaring Shears

National Machinery & Equipment Co., 2129-A Pennsylvania Ave., NW, Washington 7, D. C., is producing squaring and gap shears of all steel construction, arranged for hydro-electric drive. Employed is a hydraulic pump of sufficient pressure and capacity to give the shear the proper number of strokes at sufficient power to cut their rated capacity. Pump also furnishes power to hydraulic holddowns which are of individual cylinder construction. End housings, crosshead and table are of heavy steel construction.

Gages furnished as standard equipment are two 40-inch range front gage arms with a heavy crossbar adjust-

RESPONSIBILITY OF OPERATORS FIXED

The F. G. Schenuit Rubber Company of Baltimore, Md. sells very few of their products under their own brand name. However, their large output for merchandising firms, under various names has put this company in the front rank of quality tire producers. Much of Schenuit's production is also channeled into industrial and airplane tires where high standards of endurance are required.

New and best methods

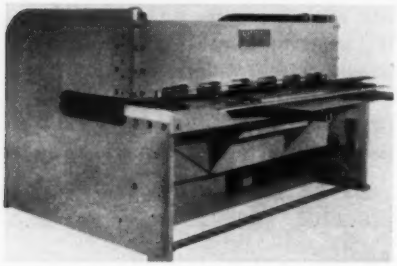
Like any other contract manufacturer, Schenuit must develop high efficiency and quality production. Shown here is operator George D. Shearer affixing his Topflight Tape number to the tire carcass he has worked on. Pressure-sensitive tape, applied in an instant, identifies his work. Because he knows his number holds him responsible, he takes greater pride and greater care.

TOPFLIGHT TAPE COMPANY

ERWIN HUBER, *President*

YORK PENNA.

able the full length through the dovetail slots in the table and a back gage of the precision parallel type. A direct reading dial shows position of back gage in inches and fractions. Shear can be operated by a full length

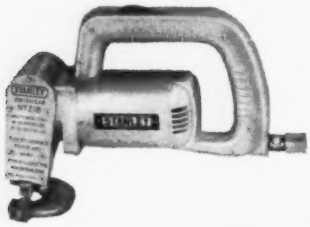


foot treadle or with an extension foot pedal on an extension cord. Knives are of high carbon chrome alloy and have four cutting edges. Overload protection is provided by a hydraulic relief valve.

Check No. 14 on Reply Card for more Details

Electric Shear

Eighteen gage mild hot rolled steel and other materials in proportion may be cut at a speed up to 15 feet per minute with the No. 218 Unishear, manufactured by Stanley Electric Tools, New Britain, Conn. Weighing only 4-3/4 pounds, it has an improved blade action which feeds in the work



so that little effort is required to cut straight lines, curves, angles and notches with considerable accuracy.

Shear is of full ball and roller bearing construction and has automatic lubrication of plunger from gear housing, slide operated switch and few moving parts. It is furnished with rubber covered three-wire cable, wrenches, clearance gage and a supply of lubricant.

Check No. 15 on Reply Card for more Details

Electric Drill

Independent Pneumatic Tool Co., 175 State St., Aurora, Ill., is producing a 7-pound portable 1/2-inch Silver Line electric drill, designed for continuous stall-free drilling through the toughest metals. Ventilation through large slotted ports keeps the Thor heavy duty motor cool under heavy load.

Drill has a highly polished die cast case, a free speed of 500 revolutions per minute, full ball bearing construction, removable dead handle, steel bearing inserts, removable switch handle for simple service, precision gearing and a 3-jaw Jacobs key type chuck. Its length is 11 inches.

Check No. 16 on Reply Card for more Details

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COUPLINGS: O. Z. Electrical Mfg. Co., Brooklyn 2, N. Y., has added three new split couplings to its line and now offers them in conduit sizes from ½ to 5 inches. They are of one-piece, malleable iron construction.

Check No. 17 on Reply Card for more Details

JACOBS CHUCK: Designated as No. 17, a new Jacobs chuck for flexible shaft machines is offered by L & R Mfg. Co., Arlington, N. J. The handpiece is made of a two-piece aluminum housing with two presealed ball bearings and features a No. 0 Jacobs chuck with 0 to 5/32-inch range.

Check No. 18 on Reply Card for more Details

HOIST: Model 500 roofer's hoist, announced by American Hoist & Derrick Co., St. Paul 1, Minn., develops a 500 pound single line pull at 200 feet per minute as standard rating. Optional ratings are available. Hoist is gasoline powered by 4.2 horsepower single cylinder, air cooled engine.

Check No. 19 on Reply Card for more Details

AIR VENTS: Sarco Co. Inc., New York 1, N. Y., offers a new line of high pressure air vents for industrial steam equipment. Powerful phosphor bronze helical bellows with relatively large diameters permit over-size valve orifices at pressures 0 to 200 pounds per square inch.

Check No. 20 on Reply Card for more Details

BELT FASTENERS: Plategrip belt fasteners pull conveyor belt ends together into a smooth, flexible tight joint. Made of heavy gage steel and designed so that they will withstand any load the belt can safely carry, these fasteners were developed by Armstrong-Bray & Co., Chicago, Ill.

Check No. 21 on Reply Card for more Details

RESIN CORE BINDER: Interlake Chemical Corp., Cleveland 14, O., announces a liquid synthetic resin core binder, designated as Ibon. It is claimed that cores of maximum baked strength and hardness are obtained at minimum binder concentration and that cores have sharper edges with better detail and greater resistance to shock and abrasion.

Check No. 22 on Reply Card for more Details

ELECTRIC TACHOMETER: M-1200 electric tachometer measuring 2-3/4 x 5-3/8 inches is available from Electric Tachometer Corp., Philadelphia 3, Pa. Designed for continuous operation, it is housed in a cast bronze case and will operate in any position through a wide range of temperatures.

Check No. 23 on Reply Card for more Details

ALKALI-EMULSION CLEANER: Northwest Chemical Co., Detroit 4, Mich., offers a combination alkali-emulsion cleaner that will remove oils and tallow based drawing compounds. It is particularly adapted to general washing machine use prior to bonderizing and painting.

Check No. 24 on Reply Card for more Details

MERCURY SWITCHES: Technical developments in the new mercury switches made by Durakool Inc., Elkhart, Ind., include an electric weld that seals hydrogen gas under pressure in the metal case of the switch. The closure keeps that pressure intact whether switch is in use or inactive on machine or in stock. Models range from 1 to 65 amperes in capacity and are made with or without plastic case included as standard equipment.

Check No. 25 on Reply Card for more Details

CUTTING ELECTRODE: Eutectic Welding Alloys Corp., New York 13, N. Y., offers a 3/32-inch diameter Cuttrode, a cutting electrode for stainless, bronze, nickel, and copper cutting.

Check No. 26 on Reply Card for more Details

BENCH GRINDER: A 6-inch utility bench grinder with dynamically balanced, fully enclosed motor of the permanent split capacitor type is offered by K. O. Lee Co., Aberdeen, S. D. Standard equipment includes two grinding wheels, fine and coarse; adjustable tool rests, and an abrasive wheel dresser.

Check No. 27 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL SUPPLY—All the signs point to continued stringency in steel supply for months to come. Despite reports of some slackening of manufacturing activities in certain directions there is practically no reflection of such in steel demand. Consumer pressure for all of the major products is as strong as ever with inquiry for tonnage still far in excess of supply. Any slack which develops is quickly taken up from another direction, and, as a result, supply-demand balance appears as distant as at any time in recent months, and this in the face of record-breaking peacetime production.

QUOTAS— Pending further clarification as to what they will be called upon to supply in the way of certified tonnage, the steelmakers are continuing to move cautiously in setting up consumer quotas for the first quarter of next year. Some of the larger producers have as yet taken no action on certain important products.

ARREARAGES— It now is evident that tonnage arrearages at the end of the year will be substantial. Consequently, except for certified work, the indications are rolling of newly placed orders will be pushed several weeks into the future. This is particularly true with respect to sheets and plates with certain mills having adopted a policy of blanking out January entirely.

PRODUCTION—Steelmaking and rolling facilities are being pressed to the limit of available raw material supply, and producers at some points are engaged above 100 per cent of practical capacity.

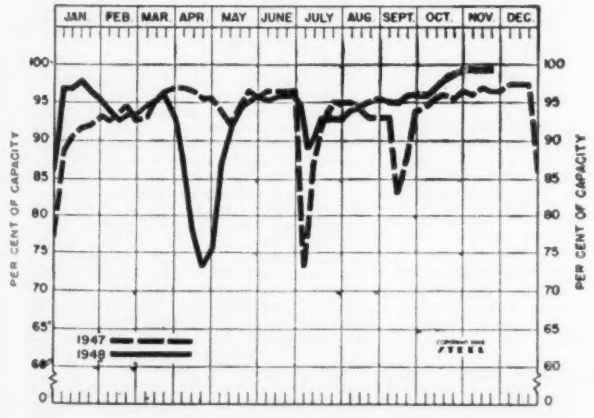
ALLOCATIONS— With demand for steel far in excess of supply, speculation is rising with respect to government policy on allocations. Last week it appeared the way was being opened for extension of the voluntary allocations programs. Public Law 395, under which these allocations are made possible, expires at the end of February but talk in Washington now is that the law likely may be extended in one form or another by the new Congress.

RAW MATERIALS— Slightly stronger undertone is noted in scrap, especially in the East. At Buffalo sales above mill formula prices were reported last week. The longshoremen's strike has tied up a number of scrap cargoes, and as result scrap brokers report market sentiment a shade stronger momentarily. Once the strike is settled foreign scrap is expected to flow into this country in increasing quantities. Some unfortunate experiences have been had with German scrap recently at the mills. While the material is good quality some live shells have been inadvertently included in furnace charges, resulting in explosions which have damaged furnaces. Domestic scrap is flowing steadily and steelmakers' inventories now are the best in months. Pig iron supply appears improved. Sellers are under less pressure although demand still exceeds supply. Domestic production is larger and the outlook is for continued shipments from abroad. At the same time, increasing spottiness in demand for gray iron castings is noted.

PRICES—Steelmakers are holding mill price schedules unchanged. However, some adjustments in extras have been effected over the past week. One large producer revised extras on hot-rolled sheets and strip and on cold-rolled sheets resulting in increases ranging from $1 to $12 per ton. This interest also plans a revision in its extra card on cold-rolled strip. Several producers also have revised galvanizing extras upward to offset the recent increase in the price of zinc.

COMPOSITES—STEEL's arithmetical price composites held unchanged last week and compared with those for the like 1947 week as follows: Finished steel, $95.05 and $76.09; semi-finished steel, $75.75 and $57.20; steelmaking pig iron, $46.29 and $36.42; steelmaking scrap, $43.25 and $40.42.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Nov. 20	Change	Same Week 1947	Same Week 1946
Pittsburgh	97.5	+ 0.5	100	98
Chicago	98	— 1	94.5	90.5
Eastern Pa.	95	None	93.5	70
Youngstown	105	None	91	75
Wheeling	92.5	None	93.5	93.5
Cleveland	99	+ 2.5	90.5	93
Buffalo	104	None	88.5	61
Birmingham	100	None	103	99
New England	90	None	87	90
Cincinnati	99	— 4	87	87
St. Louis	84.5	+ 2	78	72.5
Detroit	99	None	92	89
Estimated national rate	99	None	96.5	83

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Nov. 20	Nov. 13	Month Ago Oct. 1948	Year Ago Nov. 1947	5 Years Ago Nov. 1943
Finished Steel	$95.05	$95.05	$95.05	$76.09	$56.73
Semifinished Steel	75.75	75.75	75.75	57.20	36.00
Steelmaking Pig Iron	46.29	46.29	46.19	36.38	23.00
Steelmaking Scrap	43.25	43.25	43.25	40.42	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Oct. 1948	4.14340c
Sept. 1948	4.13446c
Aug. 1948	4.14340c
Oct. 1947	3.45536c
Oct. 1943	2.40831c

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. October, 1948, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Nov. 20, 1948	Oct. 1948	Aug. 1948	Nov. 1947
Steel bars, Pittsburgh mills	3.45c	3.45c	3.45c	2.90c
Steel bars, del. Philadelphia	3.79	3.79	3.79	3.318
Steel bars, Chicago mills	3.35	3.35	3.35	2.90
Shapes, Pittsburgh mills	3.275	3.275	3.275	2.80
Shapes, Chicago mills	3.25	3.25	3.25	2.80
Shapes, del. Philadelphia	3.48	3.48	3.48	2.954
Plates, Pittsburgh mills	3.50	3.50	3.50	2.95
Plates, Chicago mills	3.40	3.40	3.40	2.95
Plates, del. Philadelphia	3.71	3.71	3.71	3.17
Sheets, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.90
Strip, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.55
Bright basic, wire, Pittsburgh	4.325	4.325	4.325	3.675
Wire nails, Pittsburgh mills	5.775	5.775	5.775	4.625
Tin plate, per base box, Pitts. dist.	$6.70	$6.80	$6.80	$5.75

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$53.57
Slabs, Chicago	52.00	52.00	52.00	40.18
Rerolling billets, Pittsburgh	59.00	59.00	59.00	40.18
Wire rod ⅜ to ¼-inch, Pitts. dist.	3.775c	3.775c	3.775c	3.05c

* Nominal.

Pig Iron

	Nov. 20, 1948	Oct. 1948	Aug. 1948	Nov. 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$37.913
Basic, Valley	46.00	46.00	43.00	36.00
Basic, eastern del. Philadelphia	50.17	50.17	46.17	38.84
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	37.413
No. 2 fdry., del. Philadelphia	50.67	50.67	46.67	39.34
No. 2 foundry, Chicago	46.25	45.13	43.25	36.00
No. 2 foundry, Valley	46.50	43.50	43.50	36.50
Southern No. 2 Birmingham	43.38	43.38	43.38	34.88
Southern No. 2 del. Cincinnati	49.09	49.09	49.09	38.544
Malleable, Valley	46.50	46.50	43.50	36.50
Malleable, Chicago	46.50	45.38	43.50	36.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	62.00	46.40
Ferromanganese, fob Aetna, Pa.	163.00	163.00	148.00*	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$42.75	$42.75	$42.75	$40.00
Heavy melt. steel, No. 2, E. Pa.	41.50	41.50	41.50	42.40
Heavy melt. steel, No. 1, Chicago	41.75	41.75	41.75	38.75
Heavy melt. steel, No. 1, Valley	42.75	42.75	42.75	39.875
Heavy melt. steel, No. 1, Cleveland	42.25	42.25	42.25	39.625
Heavy melt. steel, No. 1, Buffalo	48.50	48.15	46.56	41.81
Rails for rerolling, Chicago	68.50	65.50	64.13	56.25
No. 1 cast, Chicago	70.50	70.75	70.75	49.00

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.38	$12.25
Connellsville, beehive foundry	17.00	17.00	17.00	14.50
Chicago, oven foundry, ovens	20.40	20.40	20.40	17.50

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $100-$105 per gross ton. Forging quality $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except $62, Conshohocken, Pa.; $66, Monessen, Pa.; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill, except: $70, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $110-$115 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅜-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c, Monessen, Pa. One producer quotes 3.90c, Chicago base. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): 3.35c, mill, except: 3.55c, Ecorse, Mich., Pittsburgh, Monessen, Aliquippa, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif., Portland, Oreg., Atlanta, Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 5.30c, Fontana, Calif.

Rail Steel Bars: (Base 10 tons): 3.35c, Moline, Ill.; 4.80c, Williamsport, Avis, Pa.; another interest quotes 5.35c, mill.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 5.50c, Fontana, Calif.

Hot-Rolled Alloy Bar Shapes: 4.00c, mill.

Cold-Finished Carbon Bars (Base 20,000-39,999 lb): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.25c, Monessen, Pa.; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.45c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.75c, Monessen, Pa.; 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.55c, Monessen, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; another interest quotes 5.35c, mill.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa., 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.95c, Pittsburgh, Torrance, Calif.; 5.00c, Conshohocken, Pa.; 5.65c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O., 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Granite City, Ill., Ecorse, Mich.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill Armature: 5.45c, mill, except: 5.95c, Warren, O.; 6.05c, Niles, O.

Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.45c, Warren, O.; 6.55c, Niles, O.

Motor: 6.70c, mill except: 6.90c, Granite City, Ill.; 7.20c, Warren, O.; 7.95c, Follansbee, W. Va., Toronto, O.; 9.20c, Brackenridge, Pa.

Dynamo: 7.50c, mill, except: 8.65c, Follansbee, W. Va., Toronto, O.; 7.70c, Granite City, Ill.; 10.00c, Brackenridge, Pa.

Transformer 72, 8.05c, mill, except; 9.15c, Follansbee, W. Va., Toronto, O.; 11.80c, Brackenridge, Pa. 65, 8.60c, mill, except: 9.85c, Follansbee, W. Va., Toronto, O.; 12.35c, Brackenridge, Pa.; 58, 9.30c, mill, except: 10.55c, Follansbee, W. Va., Toronto, O.; 13.05c, Brackenridge, Pa.; 52, 10.10c, mill, except: 11.35c, Follansbee, W. Va., Toronto, O.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., and Conshohocken, Pa., mills.

Galvanized (No. 10), 6.75c, mill.

Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich., Atlanta; 3.60c, Detroit; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 5.90c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 7.10c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.50c, New Castle, Pa., Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill, except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill, except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $6.60-$6.80; 1.50 lb coating $6.80-$7.00. Pittsburg, Calif., mill $7.35 and $7.55, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $5.80-$6.00; 0.50 lb tin, $6.00-$6.20; 0.75 lb tin, $6.20-$6.40.

Can Making Black Plate: Per base box of 100 lb, 55 to 70 lb basis weight, $5.20-$5.30; 75 to 95 lb basis weight $5.10-$5.20; 100 to 128 lb basis weight, $5.20-$5.30. $5.95, $5.85, $5.95, respectively, Pittsburg, Calif.

Holloware Enameling Black Plate: 29-gage, 4.75c per pound, except: 4.85c, Sparrows Point, Md.; 4.95c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $5.90, except: $6 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.60c, Pittsburgh; 3.65c, Ecorse, Mich.; 3.75c., Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.80c, Fontana, Calif.; 6.50c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 5.75c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa., Minnequa, Colo., Atlanta, Buffalo; 4.70c, Portsmouth, O.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco; 5.40c, Shelton, Conn. One producer quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md.; 4.95c, Monessen, Pa.; 5.10c, Worcester, Mass.; 5.15c, Minnequa, Colo., Kokomo, Ind.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.60c, Kokomo, Ind., Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110 Minnequa, Colo., Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; $6.75 per 100 pound keg, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Column 109, mill, except: 113, Monessen, Pa., Kokomo, Ind.; 116, Minnequa, Colo.; 121 Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another, column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126, Atlanta; 128, Monessen, Pa.; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Column 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind.; 110, Atlanta; 113 Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes column 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301	28.50-28.75	30.50-32.00	37.50-40.75
302	28.50-28.75	33.00-33.75	37.50-40.75
303	31.00-31.50	36.50-39.75	39.50-43.00
304	30.00-31.25	35.00-35.75	39.50-43.00
316	46.00-48.00	55.00-57.25	53.00-57.25
347	38.50-39.75	48.50-50.25	50.00-54.00

STRAIGHT CHROMIUM STEELS

410	22.75-23.00	26.50-27.00	32.00-33.00
416	23.25-23.50	28.25-33.50	32.50-33.50
430	23.25-23.50	27.00-27.50	34.75-35.50
446	32.50-33.00	60.00-62.25	46.50-50.00

STAINLESS-CLAD STEELS

	Plates —Cladding—		Sheets —Cladding—	
	10%	20%	10%	20%
302	....	....	19.75	21.50
304	22.50	26.50	20.75	22.50
310	32.50	36.50	....	....
316	27.00	31.00	26.00	28.00
321	23.50	27.50	....	....
347	25.00	29.00	24.00	26.00
405	18.75	24.75	....	....
410	18.25	24.25	....	....
430	18.25	24.25	....	....

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Blk.	Gal.	In.	Butt Weld Blk.	Gal.
⅛	39½– 41½	10– 12½	1	46– 48½	27– 29½
¼	37½– 39½	11½– 14	1¼ ...	46½– 49	27½– 30
⅜	34– 36	6½– 9	1½ ...	47– 49½	28– 30½
½	40½– 43	20– 22½	2	47½– 50	28½– 31
¾	43½– 46	24– 26½	2½, 3..	48– 50½	29– 31½
			3½ & 4	44½	27½

In.	Lap Weld Blk.	Gal.	Elec. Weld Blk.	Gal.	Seamless Blk.	Gal.
2	39½	19½	38½	18½	27– 38½	7– 19
2½ ..	42½– 43½	22½– 23½	41½	21½	32½– 41½	12½– 22
3	42½– 43½	22½– 24	41½	21½	35– 41½	15– 22
3½ & 4	42½– 46½	22½– 26½	43½	23½	38½– 43½	18½– 24
5 & 6	42½– 44½	22½– 24½	43½	23½	38½– 43½	18½ 24
7	....	....	....	....	43½	22½

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

In.	Butt Weld Blk.	Gal.	In.	Butt Weld Blk.	Gal.
⅛	40½	....	1¼ ...	46–	28–
¼	38½	....		48	29
⅜	35	....	1½ ...	46½– 48½	28½– 29½
½	40– 42	20½– 21½	2	47– 49	28½– 30
¾	43– 45	24½– 25½	2½ & 3	47½– 49½	29– 30½
1	45½– 47½	27½– 28½	3½ & 4	43½	....

In.	Lap Weld Blk.	Gal.	Elec. Weld Blk.	Gal.	Seamless Blk.	Gal.
2	38½	18½	37½	17½	26– 37½	6– 18
2½ ..	41½– 42½	22½	40½	20½	31½– 40½	11½– 21
3	41½– 42½	22½	40½	20½	34– 40½	14– 21
3½-4.	41½– 45½	22– 25½	42½	22½	37½– 42½	17½– 23
5 & 6	41½– 43½	22	42½	22½	37½– 42½	17½– 23
8	45½	..	44½	23½– 24	40½– 44½	19½– 24
10 ...	45	..	44	23– 23½	41½– 44	20½– 23½
12 ...	44	..	43	22	40½– 43	19½– 22½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Bulk	Gal.	In.	Lap Weld Bulk	Gal.
⅜ ...	+59½	+93	1¼ ..	+22	+50½
½ ...	+20½	+50	1½ ..	+15½	+43
¾ ...	+10½	+39	2. ..,	+ 7½	+34
1 and 1¼	+ 4½	+30	2½-3½	+ 5	+29½
1½ ..	— 1½	+26½	4....	List	+23⅝
2....	— 2	+26	4½-8	+ 2	+25
			9-12.	+12	+34½

Boiler Tubes: Net base c.l. prices, dollars per 100′, mill; minimum wall thickness, cut lengths 4 to 24″; inclusive.

O.D. In.	B.W. Ga.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1	13	....	13.39	13.00	13.00
1¼	13	....	15.87	13.21	15.39
1½	13	$15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

Pipe Cast Iron: Class B, 6-in. and over, $93.50 per net ton, Birmingham; $106.70, del. Chicago; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb, mill, except: $3.50, Indiana Harbor, Ind.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $4.70 per 100 lb, Williamsport, Pa.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill, except: 5.25c, Pittsburgh.

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49 50
Newark, N. J., del.	50.39	50.89	51.39	51.89
Brooklyn, N. Y., del.	....	52.40	52.90	....
Philadelphia, del.	50.17	50.67	51.17	51.67
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.09	....	....
Buffalo, furnace	*47.00	*47.00	*47.50	48.00
Boston, del.	55.42	55.42	55.92	....
Rochester, del.	49.22	49.22	49.72	50.22
Syracuse, del.	50.025	50.025	50.525	41.025
§**Chicago,** district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.72	47.72-48.22	48.22	48.72
Muskegon, Mich., del.	....	50.98-51.48	51.48	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.17	48.67	48.67	49.17
Lone Star, Tex., furnace	....	†75.00	....	....
Duluth, furnace	....	46.00	46.50	47.00
Erie, Pa., furnace	45.50	46.00	46.50	47.00
Everett, Mass., furnace	....	49.50	50.00	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	53.63	....	....
Portland, Oreg., del.	....	53.63	....	....
Los Angeles, San Francisco	53.13	53.63	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65	49.15	49.65	....
Ironton, Utah, furnace	....	46.50	....	....
‡**Neville Island, Pa.,** furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	42.50	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	45.50	46.00	46.50	47.00
Cincinnati, del.	50.05	50.55	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	49.87	50.37	50.37	50.87

* Republic Steel Corp. quotes $1 a ton higher for basic, No. 2 foundry and malleable at Buffalo.

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base) .$59.50
6.51-7.00.. 60.75 9.01- 9.50. 67.00
7.01-7.50.. 62.00 9.51-10.00. 68.25
7.51-8.00.. 63.25 10.01-10.50. 69.50
8.01-8.50.. 64.50 10.51-11.00. 70.75
8.51-9.00.. 65.75 11.01-11.50. 72.00

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $84.75 furnace, Niagara Falls; $84 open-hearth and $85 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. F.o.b. furnace, Lyles, Tenn. ..$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., $54; Buffalo, Troy, N. Y., $50. Philadelphia, $56.81 delivered.

Intermediate phosphorus, Central furnace, Cleveland, $51.

Differentials

Prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more $37; less than 60% $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$13.50-15.50
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60

Oven Foundry Coke

Kearney, N. J., ovens	$21.50
Chicago, ovens	20.40
Chicago, del.	†21.75
Detroit, del.	23.95
Terre Haute, ovens	21.00
Milwaukee, ovens	21.15
Indianapolis, ovens	20.85
Chicago, del.	24.00
Cincinnati, del.	21.40
Detroit, del.	24.40
Ironton, O., ovens	18.25
Painesville, O., ovens	20.90
Erie, del.	22.57
Cleveland, del.	22.46
Buffalo, del.	23.25
Birmingham, ovens	17.70
Philadelphia, ovens	20.55
Swedeland, Pa., ovens	20.50
Portsmouth, O., ovens	19.25
Detroit, ovens	20.65
Detroit, del.	*21.65
Flint, del.	22.85
Pontiac, del.	21.91
Saginaw, del.	23.15

Includes representative switching charge of: *, $1; †, $1.35.

Coal Chemicals

Spot, cents per gallon, ovens

(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50

Per ton, bulk, ovens

Sulphate of ammonia	$45.00

Per pound, ovens

(Effective as of Oct. 1)

Phenol, 40 (car lots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50

(Effective as of Oct. 25)

Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $100.

High-Heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, or Athens, Ky., Troup, Tex., Stevens Pottery, Ga., or Portsmouth, O., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., $83; Beach Creek, Pa., $73.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Chrome brick or chemical-bonded chrome brick, $69, magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains: Bulk, $31; single paper bags, $35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibonsburg, Woodville, O., $11.85; Thornton, McCook, Ill., $11.95; Dolly Sliding, Bonne Terre, Mo., $12.05.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	14.50
Brazil iron ore, 68-69%	18.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, f.o.b. cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb, Mo., cont. Mines	$0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ¾" & Thicker
Boston (city) ..	5.84	6.64	7.84	6.04	6.90	5.69	6.39	8.24-9.74	5.54	5.89	7.34
Boston (c'try) .	5.69	6.49	7.69	5.89	6.75	5.54	6.24	8.09-9.59	5.39	5.74	7.19
New York (city)	5.73-5.80	6.73	7.74-7.83	6.08-6.28	...	5.73	6.58	8.67	5.52-5.78	5.98	7.48
New York(c'try)	5.53-5.60	6.53	7.54-7.63	5.88-6.08	...	5.53	6.38	...	5.32-5.58	5.78	7.28
Phila. (city)...	5.50-5.86	6.61-6.81	7.42-7.62	5.46-5.81	...	5.57-5.65	6.31	8.39	5.24-5.40	5.52-5.65	6.73-7.16
Phila. (c'try) ..	5.35-5.71	6.46-6.66	7.27-7.47	5.31-5.66	...	5.42-5.50	6.16	8.24	5.09-5.25	5.37-5.50	6.58-7.01
Balt. (city) ...	5.43†	6.33	7.18	5.49	...	5.54	...	...	5.48	5.68	7.13
Balt. (c'try)...	5.28†	6.18	7.03	5.34	...	5.39	...	...	5.33	5.53	6.98
Norfolk, Va. ..	5.75	...	...	...	...	6.00	7.00	...	6.00	6.00	7.50
Wash. (w'house)	5.81-5.97	...	...	5.87	...	5.88-5.92	6.58	...	5.82-5.86	6.02-6.06	7.47-7.51
Buffalo (del.)..	5.20-5.25	5.95-6.00	7.75	5.70	6.50	5.35	6.05	9.50	5.25	5.60	7.70
Buff. (w'house)	5.05-5.10	5.80-5.85	7.60	5.55	6.35	5.20	5.90	9.40	5.10	5.45	7.55
Pitts. (w'house)	4.85-5.00§	5.75-5.85[8]	7.00-7.05	5.00-5.35	5.95-6.00	4.90-5.10	5.65	7.65	4.90-5.15	5.05-5.25	6.55
Det. (w'house).	5.40-5.75§	6.30-6.60	7.60	5.40-5.70	6.50	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.)	5.13-5.90‡‡	5.90-6.29	7.34-8.00‡‡	5.17-5.69	6.45-6.85	5.30-5.35	6.05-6.10	8.24-8.54	5.34-5.60	5.50-5.55	6.95-7.00
Cleve. (w'hse) .	4.98-5.75	5.75-6.14	7.19-7.85	5.02-5.54	6.30-6.70	5.15-5.20	5.90-5.95	8.09-8.39	5.19-5.45	5.35-5.40	6.80-6.85
Cincin. (w'hse).	5.26	6.11	7.60	5.52	6.07	5.52	6.07	...	5.37	5.61	6.91
Chicago (city)..	5.00-5.20	5.90‡[8]	7.20-7.25	5.00	6.64-6.80	5.05	5.85	8.25[9]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05	5.75‡[8]	7.05-7.10	4.85	6.49-6.65	4.90	5.70	8.10[9]	4.90	5.10	6.55
Milwaukee (city)	5.37	6.07‡[8]	7.37-7.42	5.17	6.81-6.97	5.22	6.02	8.42[9]	5.22	5.42	6.87
St. Louis (del.)	5.34§	6.24[8]	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse).	5.19§	6.09[8]	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.66	...	5.15	5.40	7.41-7.66
Birm'ham(c'try)	5.05§	...	6.45	5.05	...	5.00	6.51	...	5.00	5.25	7.26-7.51
Omaha, Nebr...	6.07	...	9.33	6.07	...	6.12	6.92	...	6.12	6.32	7.77
Los Ang. (city)	6.55§	8.05	8.20†	6.75	9.50	6.20	8.00-8.50	...	6.70	6.40	8.15
Los Angeles (w'house) ...	6.40§	7.90	8.05†	6.60	9.35	6.05	7.85-8.35	...	6.55	6.25	8.00
San Francisco..	5.95[21]	7.15	8.05	6.75[21]	8.25[16]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma .	6.35[17]	7.90[8]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[13]	6.35[13]	8.40[13]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ¾ x 6-in. and shorter.....	37 off
¾-in. and larger x 6-in. and shorter..	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter.....	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅛-in. and smaller.....	41 off	.....
¼-in. and smaller.....	.....	38 off
½-in.-1-in.	39 off	.....
⅝-in.-1-in.	.....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright).....	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter.....	40 off
¾, ⅞, & 1 x 6 and shorter.....	35 off

Square Head Set Screws

Upset 1-in. and smaller.....	51 off
Headless, ¼-in. and larger.....	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
½-in. and under	48 off

Washers, Wrought

Fob shipping point, to jobbers...Net to $1 off

FERROALLOY PRODUCT PRICES

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $57, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn.) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $160 per gross ton of alloy, c.l., packed, $172; gross ton lots, packed, $187; less gross ton lots, packed, $204; f.o.b. Alloy, W. Va., Niagara Falls, N. Y. ;or Welland, Ont. Base price; $165, Rockwood, Tenn.; $162, f.o.b. Birmingham and Johnstown, Pa., furnaces; $160, Sheridan, Pa.; $163, Aetna, Pa. Shipment from Pacific Coast warehouses on one seller add $31 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Ore. Shipment from Chicago warehouse, ton lots, $201; less gross ton lots, $218 fob Chicago. Add or subtract $2 for each 1%, or fraction thereof, of contained manganese over 82% and under 78%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 26.0c, ton lot 27.1c, less ton 28.3c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices, Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb. of contained Cr, c.l., packed 22.9c, ton lot 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.05% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

20-30% Ferrosilicon: Contract, carload, lump, bulk, 16.50-17.50c per lb of contained Si; packed 18.90c; ton lots 20.00c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.5c per lb of contained Si, carload

(*Please turn to Page 152*)

Zinc Advances to 32-Year High

Prime western rises to basis of 17.50c, East St. Louis, as supplies continue tight. Stringency also rapidly developing in copper, while tin supplies increase

New York—Zinc prices have advanced 2 cents per lb. to the basis of 17.50c, East St. Louis. This is the highest level attained since 1916 and compares with the OPA wartime price of 8.25c.

Although prices of other major metals remained unchanged last week, undertone of the markets stiffened following the tie-up of foreign supplies by the longshoremen's strike.

Zinc — Strength of the domestic zinc market was seen as an aftermath of the strikes earlier this year which reduced production at a time when demand was well in excess of supplies. Following establishment of the 17.50-cent level for prime western, other grades moved proportionately higher, while a like advance was made in the price of zinc sheet, strip, and plates.

Committees representing producers, consumers and importers of zinc and copper favor continuation of the policy of establishing open-end export quotas for materials and products processed from imported ores and concentrates of those metals. However, no definite proposals were made at their meeting last week with OIT officials.

Copper—Shutdown of the Kennecott Copper Corp.'s operations in Utah due to a strike became even more serious last week when the longshoremen's strike tied up shipments of badly needed foreign metal. Imports during September held steady at about 21,370 tons, making the nine months' total 181,878 tons. The increasingly serious shortage of copper has stimulated activity in the gray market where unconfirmed sales have been reported as high as 28.00c per lb for electrolytic. The producers' market held firm, however, at 23.50c, delivered Connecticut Valley.

Deliveries of refined copper declined 10,358 tons last month to 112,580 tons while production eased 1540 tons to 101,436. These downward trends will be accelerated during the current month. Production of crude copper declined to 81,692 tons from 88,105 tons in September, the former figure including 73,754 tons from primary and 7938 tons from secondary sources. As a result of the decline in deliveries, stocks of refined metal increased 4156 tons to a total of 76,371 tons. World stocks increased 4746 tons in October to a total of 234,265 tons.

Lead — Irwin H. Cornell, former vice president and sales manager, St. Joseph Lead Co., has been named consultant to the Bureau of Federal Supply. This agency purchases strategic metals and minerals for the government's permanent stockpile. Mr. Cornell will expedite the purchases of lead which have totaled 19,000 tons compared with a goal of 70,000 tons by June 30, 1949. The methods used in acquiring the necessary tonnages will determine in large measure the impact that this program will have on industrial users.

Supplies continue tight, but no price changes were reported last week. The situation is aggravated by the longshoremen's strike which has tied up some cargoes. Imports of pig lead increased about 7400 tons in September to 28,504 tons, bringing the total for the first nine months to 163,954 tons compared with 113,872 tons in the like 1947 period. September imports included 3770 tons from Belgium against 471 in August, and 3443 tons from Italy against 250 in August. These imports were made at high premium prices to partially offset the shortage of domestic metal.

Tin—Stocks of pig tin held by the Office of Metals Reserve which were available for sale on Oct. 31 totaled 44,814 tons, or an increase of 3239 tons for the month and 20,259 tons for the first 10 months. Another indication of a steadily improving supply picture was the report of larger imports of ores and concentrates from Bolivia, amounting to 3255 metric tons of fine tin in September compared with 2542 tons in August. However, supplies have not increased to the extent that restrictions on use can be relaxed in the near future.

Cadmium—Effective as of Nov. 15, price of cadmium sticks and bars advanced 10 cents a lb to $2 per lb in wholesale lots. Cadmium anodes and patented shapes advanced a like amount to $2.10 per lb. Demand continues well in excess of supplies.

Northwest Aluminum Output Cut

Seattle — State Department of Public Utilities has called a public hearing at Seattle Nov. 23 to inquire into all phases of the power shortage with the possibility of public action to restrict the use of electricity. Representatives of the states of Oregon, Idaho and Montana, as well as public utility districts, cities and officers of the Bonneville Power Administration have been invited. Operators of both privately and publicly owned power plants are planning a campaign to restrict the use of power during certain hours to meet a potential shortage of 150,000 kws. The Bonneville Power Administration has advised four aluminum plants in this area of a cutback of 82,000 kws, effective Nov. 13, as follows: Alcoa, Vancouver, Wash., 42,200 kws; Kaiser Metals Corp., Spokane, 32,000 kws; Reynolds Metals Co., Longview, Wash., 6000 kws; Electro-Metallurgical Corp., Portland, Oreg., 1060 kws. The cutbacks are on power which had been available beyond contract minimum. Reynolds' Troutdale plant at Troutdale, Oreg., is not affected as it has been operating within its contract. Contracts will be observed, allowing continued operations, although lower power supplies will probably reduce aluminum output during the winter an estimated 35 million pounds.

Offers To Sell Aluminum Plant

Washington — The aluminum reduction plant at Riverbank, Calif., which was designed to produce 108 million pounds of aluminum for World War II use, is being offered for sale or lease by the Federal Works Agency. Sealed proposals for purchase or lease will be received until Jan. 12, 1949.

The plant is one of twelve industrial facilities which recently were transferred from government surplus to the National Industrial Reserve under custody of the Federal Works Agency to be placed in stand-by status. It was decided to offer the plant for sale or lease in an effort to relieve the national shortage of aluminum. Production facilities of the plant consist of three substantially completed pot lines of 128 pots per line, of which two were in service during the war. Some rehabilitation work by the purchaser or lessee will be required to put the plant back in operation.

Relocation of the facilities will be considered for approval by the Munitions Board, providing there is no decrease in the rated capacity of the relocated equipment. Costs of rehabilitation or relocation would be borne by the new operator. While some of the buildings are not movable, the functional lines and many of the structures are suitable for relocation, if it is found desirable.

Sets Aluminum Export Quotas

Washington — An export quota of 8500 tons of aluminum sheet, plate, and strip has been established for the fourth quarter of 1948 by the Office of International Trade.

Aluminum sheets, plates, and strips were added to OIT's Positive List on Aug. 25 and since that time have required licenses for shipment to any destination except Canada. For the balance of the third quarter, however, no overall ceiling was set on exports of these commodities.

Ontario Metal Output Gains

Toronto — Nickel-copper industry of Ontario, notwithstanding the fact that lower grades of ore are being treated, increased its production of nickel by 11 per cent and that of copper by 5 per cent during the first nine months this year, according to the Statistical Branch, Ontario Department of Mines. Production includes that of International Nickel Co. of Canada and Falconbridge Nickel Mines Ltd. Nickel output amounted to 190,477, 103 pounds for the three quarters of this year against 170,776,213 pounds in the 1947 period; copper output was estimated at 183,488,310 pounds compared with 174,529,644 pounds in the three quarters of 1947.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley; Lake, 23.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.50-18.00c.

Zinc: Prime western 17.50c, brass special 17.75c, intermediate 18.00c, East St. Louis; high grade 18.50c, delivered.

Lead: Common 21.30-21.35c, chemical and corroding 21.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 26.00-26.25c; No. 12 foundry alloy (No. 2 grade) 25.25-26.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 27.50-28.50c; grade 2, 26.50-27.00c; grade 3, 25.50-26.25c; grade 4, 25.00-25.25c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $76-$78 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2, del.; special or patented shapes, $2.10.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 74.25c per ounce.

Platinum: $93-$96 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$115 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, fob mill)

Sheet: Copper 37.18; yellow brass 33.75; commercial bronze, 95%, 37.11; 90%, 36.63; red brass, 85%, 35.64; 80%, 35.16; best quality, 34.63; nickel silver, 18%, 46.41; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.03; cold drawn 34.28; yellow brass, free cutting, 33.44; commercial bronze, 95% 36.80; 90% 36.32; red brass, 85% 35.33; 80% 34.85.

Seamless Tubing: Copper 37.22; yellow brass 36.76; commercial bronze 90% 39.29; red brass 85% 38.55; 80% 38.07.

Wire: Yellow brass 34.04; commercial bronze, 95% 37.40; 90% 36.92; red brass, 85% 35.93, 80% 35.45; best quality brass 34.92.

Copper Wire: Bare, soft, fob eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, fob eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l. (Two producers quote 1-cent per pound lower.)

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $27.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $27.25 per cwt; cut coils, $27.50. Traps and Bends: List price plus 80%.

ZINC

Sheets, 22.00-22.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 20.75-21.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 19.75-20.50c; over 12-in., 20.75-21.50c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb., 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19,900 lb, 15.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24,50c, fob Cleveland, freight allowed on barrels, or 3 or more kegs.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 39.25c, fob Cleveland; 39.00c, Detroit; 38.00c, fob Philadelphia. **Stannous Sulphate:** Less than 2000 lb, in 100 lb kegs, 100.00c, in 400 lb bbl. 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, Wis.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 23.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.000	17.750	17.125
Commercial Bronze			
95%	20.125	19.875	19.375
90%	19.750	19.500	19.000
Red brass			
85%	19.750	19.500	19.000
80%	19.500	19.250	18.750
Best Quality (71-79%)	19.000	18.750	18.250
Muntz Metal	17.250	17.000	16.500
Nickel, silver, 10%	19.625	19.375	9.813
Phos. bronze, A.	22.625	22.375	21.375
Naval brass	17.750	17.500	17.000
Manganese bronze	17.750	17.500	16.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 19.75, No. 2 copper 18.75, light copper 17.75, composition red brass 17.00, auto radiators 14.25, heavy yellow brass 13.00, brass pipe, 14.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 20.50-21.00, No. 2 copper 19.50-20.00, light copper 18.50-19.00, refinery brass (60% copper), per dry copper content 18.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 18.00-18.50, No. 2 17.00-17.50, light copper 16.00-16.50, No. 1 composition red brass 15.25-15.50, No. 1 composition turnings 14.75-15.00, mixed brass turnings 8.75-9.00, new brass clippings 15.00-15.50, No. 1 brass rod turnings 12.00-12.50, light brass 8.25-8.75, heavy yellow brass 11.00-11.25, new brass rod ends 12.50-13.00, auto radiators, unsweated 12.75-13.00, cocks and faucets 12.25-12.50, brass pipe 12.75-13.25.

Lead: Heavy 19.50-20.00, battery plates 12.25-12.75, linotype and stereotype 18.00-18.50, electrotype 16.50-17.00, mixed babbitt 15.75-16.25, solder joints, 19.75-20.25.

Zinc: Old zinc 10.00-10.50, new die cast scrap 9.00-9.25, old die cast scrap 6.75-7.25.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 16.00-16.50, old sheets 12.50-13.00, crankcase 12.50-13.00, borings and turnings 6.00-6.50, pistons, free of struts, 12.50-13.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. Avg.	23.50	19.325	15.173	103.00	16.846	37.423	40.00	77.226
Sept. Avg.	23.50	19.325	15.00	103.00	16.50	35.00	40.00	75.284
Nov. 1-6	23.50	21.30-21.35	15.50	103.00	17.00	38.50	40.00	74.75
Nov. 8-11	23.50	21.30-21.35	15.50	103.00	17.00	38.50	40.00	74.25
Nov. 12-15	23.50	21.30-21.35	15.50-17.50	103.00	17.00	38.50	40.00	74.25
Nov. 16-18	23.50	21.30-21.35	17.50	103.00	17.00	38.50	40.00	74.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00*
No. 1 Busheling	42.50-43.00*
Nos. 1, 2 Bundles	42.50-43.00
No. 3 Bundles	40.50-41.00
Machine Shop Turnings	37.50-38.00
Mixed Borings, Turnings	37.50-38.00
Short Shovel Turnings	38.00-39.50
Cast Iron Borings	39.50-40.00
Bar Crops and Plate	49.00-50.00
Low Phos. Steel	49.50-50.00
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	65.00-66.00
Machinery Cast	72.00-73.00
Charging Box Cast	61.00-62.00
Heavy Breakable Cast	60.00-61.00
Malleable	74.00-75.00
Brake Shoe	57.50-58.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
R.R. Malleable	75.00-80.00
Axles	55.25-56.25
Rails, Rerolling	59.00-60.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Railroad Specialties	57.50-58.00
Uncut Tires	54.50-55.00
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$42.00-42.50*
No. 2 Heavy Melt. Steel	42.00-42.50*
No. 1 Busheling	42.00-42.50*
Nos. 1 & 2 Bundles	42.00-42.50*
Machine Shop Turnings	37.00-37.50
Mixed Borings, Turnings	36.50-38.50
Short Shovel Turnings	38.00-38.50
Cast Iron Borings	38.00-38.50
Bar Crops and Plate	47.00-47.50
Punchings & Plate Scrap	47.00-47.50
Heavy Turnings	42.00-43.00
Alloy Free Turnings	40.00-41.00
Cut Structurals	48.50-51.50

Cast Iron Grades

No. 1 Cupola	75.00-77.00
Charging Box Cast	62.00-64.00
Stove Plate	65.00-67.00
Heavy Breakable Cast	57.00-62.00
Unstripped Motor Blocks	62.00-64.00
Malleable	79.00-81.00
Brake Shoes	55.00-57.00
Clean Auto Cast	75.00-77.00
No. 1 Wheels	64.00-66.00
Burnt Cast	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*
R.R. Malleable	80.00-82.00
Rails, Rerolling	60.00-66.00
Rails, Random Lengths	60.00-61.00
Rails, 3 ft and under	63.00-66.00
Cast Steel	55.00-57.00
Railroad Specialties	58.00-60.00
Uncut Tires	58.00-59.00
Angles, Splice Bars	61.00-63.00

* Plus applicable freight springboard on earmarked material.

VALLEY

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00
No. 1 Bundles	42.50-43.00
Machine Shop Turnings	37.00-39.00
Short Shovel Turnings	39.00-39.50
Cast Iron Borings	38.50-39.00
Low Phos.	48.50-50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$37.50-38.00
Short Shovel Turnings	39.50-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	$42.00
No. 2 Heavy Melt. Steel	42.00
No. 1 Busheling	42.00
Nos. 1 & 2 Bundles	42.00
Machine Shop Turnings	36.00
Mixed Borings, Turnings	36.00
Short Shovel Turnings	38.00
Cast Iron Borings	37.00

Cast Iron Grades

No. 1 Cupola Cast	63.00
Charging Box Cast	53.00
Heavy Breakable Cast	59.00
Stove Plate	55.00
Unstripped Motor Blocks	56.00
Brake Shoes	50.00
Clean Auto Cast	63.00
Drop Broken Cast	71.00

Railroad Scrap

No. 1 R.R. Heavy Melt	43.00
R.R. Malleable	75.00
Rails, Rerolling	62.00
Rails, Random Lengths	58.00
Rails, 18 in. and under	63.00

DETROIT

(Brokers' buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
No. 3 Bundles	37.50-38.00
Machine Shop Turnings	31.50-32.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings	32.50-33.00
Cast Iron Borings	32.50-33.00
Punchings & Plate Scrap	42.50-43.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast	54.00-59.00
Clean Auto Cast	60.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$48.00-49.00
No. 2 Heavy Melt. Steel	41.75-42.25
No. 1 Busheling	41.75-42.25
No. 1 & 2 Bundles	41.75-42.25
Machine Shop Turnings	38.00-38.50
Mixed Borings, Turnings	38.00-38.50
Cast Iron Borings	39.00-39.50
Short Shovel Turnings	40.00-40.50
Low Phos.	49.00-51.00

Cast Iron Grades

No. 1 Cupola	65.75-66.25
Heavy Breakable Cast	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under	59.00-61.00
Railroad Specialties	58.00-60.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$45.00-45.50
No. 2 Heavy Melt. Steel	41.50
No. 1 Busheling	41.50
Nos. 1 & 2 Bundles	41.50
No. 3 Bundles	39.50
Machine Shop Turnings	37.50
Mixed Borings, Turnings	37.50
Short Shovel Turnings	38.50-39.00
Bar Crop and Plate	49.00-51.00
Punchings & Plate Scrap	49.00-51.00
Cut Structurals	49.00-51.00
Elec. Furnace Bundles	47.00-48.00
Heavy Turnings	45.50-46.50
No. 1 Chemical Borings	46.00-46.50

Cast Iron Grades

No. 1 Cupola Cast	63.00-65.00
No. 1 Machinery Cast	67.00-68.00
Charging Box Cast	64.00-65.00
Heavy Breakable Cast	62.00-62.50
Unstripped Motor Blocks	59.50
Malleable	80.00-81.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	69.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings	30.00-31.50
Punchings & Plate Scrap	42.00-42.50
Cut Structurals	42.00-42.50
Elec. Furnace Bundles	42.00-42.50

Cast Iron Grades

No. 1 Cupola Cast	57.00-58.00
Charging Box Cast	57.00-58.00
Heavy Breakable	58.00
Unstripped Motor Blocks	53.50-54.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$38.90
No. 2 Heavy Melt. Steel	34.40
No. 1 Bundles	34.40
No. 1 Busheling	34.40
Machine Shop Turnings	29.90
Mixed Borings, Turnings	29.90
Short Shovel Turnings	31.90
Bar Crops and Plate	40.00-41.00
Punchings & Plate Scrap	40.00-41.00
Chemical Borings	38.00-39.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast	55.00-58.00
Stove Plate	54.00-55.00
Unstripped Motor Blocks	50.00-52.00
Clean Auto Cast	54.00-56.00

CHICAGO

No. 1 Heavy Melt. Steel	$41.50-42.00
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Bundles	41.50-42.00
No. 2 Bundles	41.50-42.00
No. 3 Bundles	39.50-40.00
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings	38.50-39.00
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	47.00-48.00
Punchings	48.00-49.00
Elec. Furnace Bundles	44.50-45.00
Heavy Turnings	41.00-41.50
Cut Structurals	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	70.00-71.00
Clean Auto Cast	70.00-71.00
No. 1 Wheels	60.00-62.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00-46.00
Malleable	81.00-82.00
Rails, Rerolling	70.00-71.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under	60.00-61.00
Rails, 18 in. and under	64.00-65.00
Railroad Specialties	55.50-56.50
Angles, Splice Bars	56.50-57.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$44.00-45.00
No. 2 Heavy Melt. Steel	40.00-41.00
Machine Shop Turnings	35.00-36.00
Short Shovel Turnings	36.50-37.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-66.00
Mixed Cast	56.00-58.00
Heavy Breakable Cast	59.00-60.00
Brake Shoes	60.00-61.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R.R. Malleable	71.00-72.00
Rails, Rerolling	63.00-65.00
Rails, Random Lengths	56.00-59.00
Rails, 3 ft and under	60.00-61.00
Uncut Tires	51.00-52.00
Angles, Splice Bars	54.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	49.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$27.50
No. 2 Heavy Melt Steel	*27.50
No. 1 Busheling	*27.50
Nos. 1 & 2 Bundles	*27.50
No. 3 Bundles	*24.50
Machine Shop Turnings	*18.00
Bar Crops and Plate	*27.50
Cast Steel	*27.50
Alloy Free Turnings	*18.00
Cut Structurals	*27.50

Cast Iron Grades

No. 1 Cupola Cast	50.00-65.00

Railroad Scrap

No. 1 Heavy Melting	*28.50
Axles	*34.00
Rails, Random Lengths	*29.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$27.50-29.00
No. 2 Heavy Melt. Steel	27.50-29.00
No. 1 Busheling	27.50-29.00
Nos. 1 & 2 Bundles	27.50-29.00
No. 3 Bundles	24.50
Machine Shop Turnings	21.00-22.50
Mixed Borings, Turnings	21.00-22.50
Punchings & Plate Scrap	35.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	50.00
Heavy Breakable Cast	35.00
Stove Plate	30.00
Unstripped Motor Blocks	32.50
Malleable	40.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	37.50-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
Railroad Malleable	30.00
Rails, Random Lengths	30.00-32.00
Angles and Splice Bars	28.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
Nos. 1 & 2 Bundles	27.50
Machine Shop Turnings	20.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles	28.00

Cast Iron Grades

No. 1 Cupola Cast	50.00-55.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00-50.00
No. 2 Cast	44.00-45.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

For High Density Bales...use the Self-Contained

LOGEMANN Scrap Presses

Press, Pump, Tank . . . all in one compact assembly

Available with Automatic Control

Both two and three ram models are available with automatic controls . . . and are recommended when the nature of the scrap warrants such application and where high output is desired.

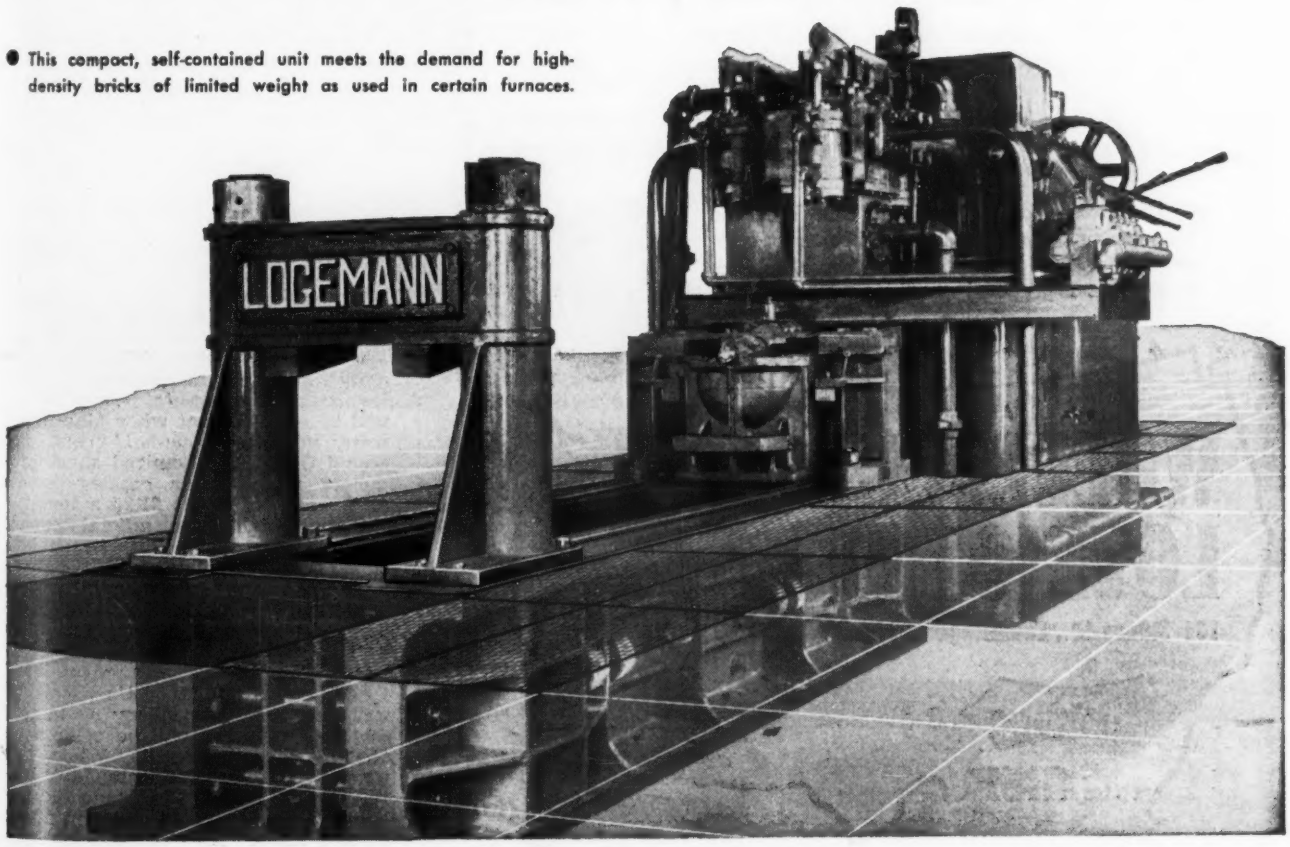
You conserve floor space and piping in plants and mills where space is limited . . . and at the same time, handle high tonnages at extremely low operating cost.

Pioneers in the metal baling field, LOGEMANN engineers have embodied the features proved through actual operation to be essential to constant, uninterrupted service. These same engineers are prepared to offer suggestions as to operating layout and installation of any unusual or specific need. Present your problem to them, stating the nature of your scrap and the tonnage desired. There is no obligation.

LOGEMANN BROTHERS CO.

3164 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

● This compact, self-contained unit meets the demand for high-density bricks of limited weight as used in certain furnaces.



"Miss Great Lakes" Gold Cup winner for '48

Depended on Wheelock, Lovejoy Alloy Steel

Photo Courtesy The Detroit News

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DISABLED 12 OUT OF 14 BOATS

Properly selected alloy steel, from which vital equipment was fabricated, played a leading role in winning the grueling 1948 Gold Cup race that saw only 2 of 14 starters cross the finish line. The winner, "MISS GREAT LAKES", driven by Danny Foster and owned by Al Fallon, had underwater struts, rudder, jack shaft and steering pitman arm made from Wheelock, Lovejoy HY-TEN B #3X steel. This particular alloy was selected and properly heat treated to meet the most rugged conditions possible. The fact that not one of these parts failed or even bent, in spite of the terrific beating they took, is ample proof of HY-TEN's superior physicals. And it's proof too that Wheelock, Lovejoy knows steel. Perhaps you have a tough job that demands just the right steel—write Wheelock, Lovejoy today.

WL *steels are metallurgically constant. This guarantees uniformity of chemistry, grain size, hardenability—thus eliminating costly changes in heat treating specifications.*

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Sheets, Strip . . .

Hot-rolled sheet and strip extras revised upward by a leading producer

Sheet Prices, Page 126

Cleveland — Republic Steel Corp. revised size and processing extras on hot-rolled carbon sheet and strip and cold-rolled carbon sheet Nov. 15. Adjustments were made because of increased costs, and in some cases the changes were the first to be made in 15 years.

Revisions follow: Hot-rolled sheets, 18-gage and heavier—Increases in gage and width extras range from 10c to 35c per hundredweight; length extras, increases range from 10c to 15c cwt.; pickling (oiled or dry), up 15c cwt.; stretcher leveling (not resquared), up 25c cwt.; breaker passing (back coiling), coils only, up 10c cwt.; resquaring, formerly was 5 per cent, now is 10 per cent; restricted thickness tolerance extras, increases range from 30c to 50c cwt.; heat treatment extras, increased 25c cwt.

Hot-rolled strip—Increases in gage and width extras range from 40c to 60c cwt.; pickling (oiled or dry), increases range from 5c to 10c cwt.; cut length extras, increases range from 10c to 20c cwt.; heat treatment extras, increases range from 25c to 30c cwt.; special killed steel and special soundness quality, extras on each increased 10c cwt.

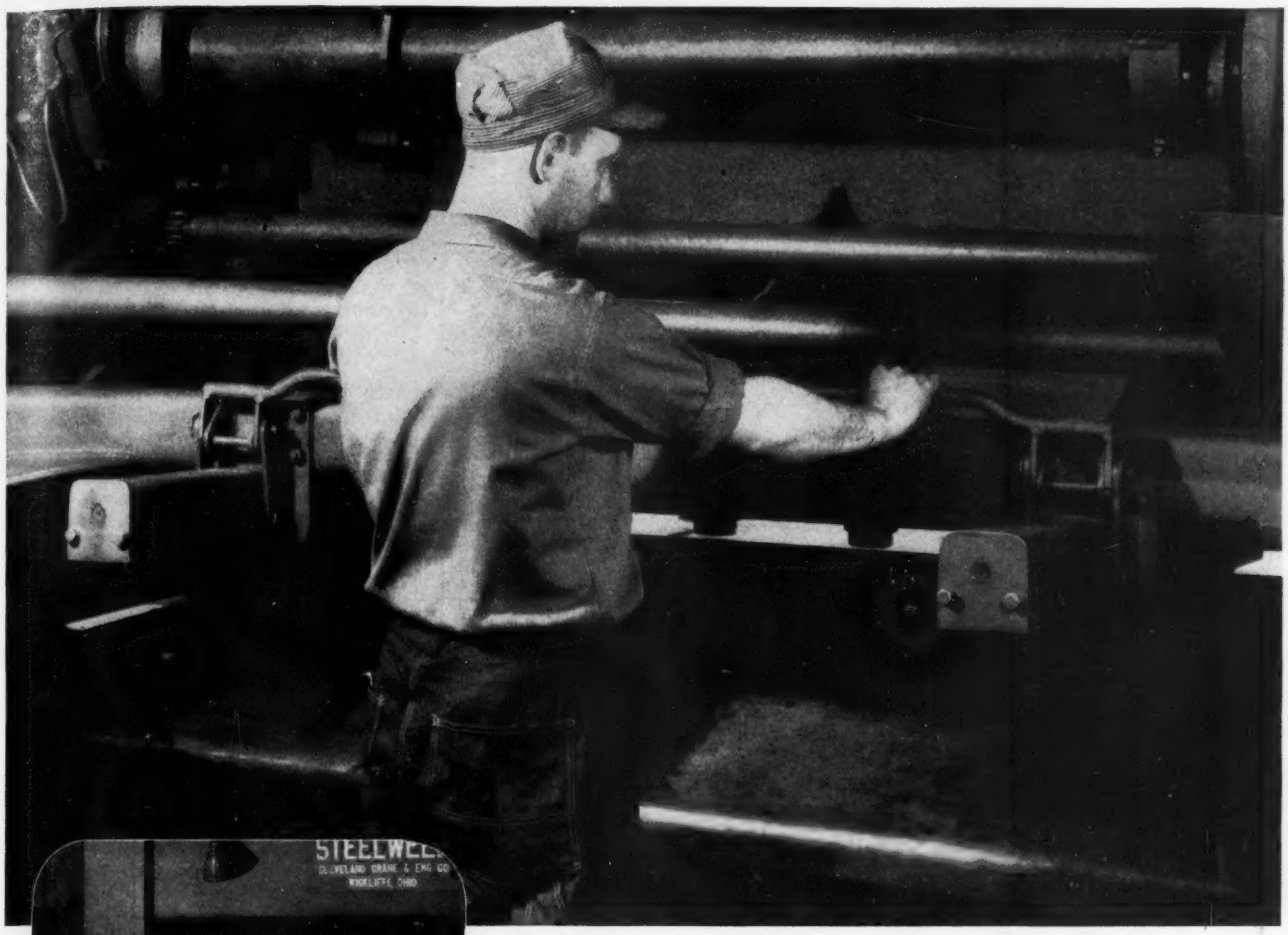
Cold-rolled sheets—Special killed steel extras, increased 10c cwt.; stretcher leveling, now 50c cwt. on all gages, previously was 25c to 50c; resquaring, was 5 per cent, now is 10 per cent; special soundness quality of 35c cwt. instituted.

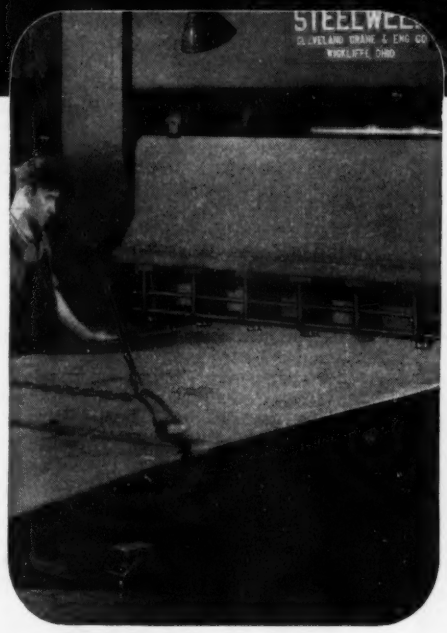
Republic is also revising its cold-rolled strip extras book to conform with standards of a new AISI manual.

To reflect the recent increase in the price of zinc, Republic's extras on galvanized and roofing sheets increased last week from 5c cwt. on heavy gages to 24c cwt. on lightest gages.

Pittsburgh — Leading galvanized sheet producers are expected to revise coating extras tables for galvanized and culvert sheets to reflect the advance of 2 cents to 17-1/2 cents per pound for prime western zinc, E. St. Louis. Since no official action has yet been taken, it is difficult to estimate the amount of increase in extras for galvanized sheets. However, it will be recalled that when zinc prices were advanced one-half cent per pound Oct. 23, galvanized sheet producers raised their coating extras an average of about $1.25 a ton.

Sharon Steel Corp. officials expect to have company's new 14-inch hot-rolled strip mill, built by United Engineering, in full operation by middle of January. This mill will take the place of company's 9-inch hot strip mill and is expected to produce hot-rolled strip in width range of 3-1/2 to 8 inches. Much of the electrical units and other auxiliary equipment of the 9-inch mill will be utilized on the 14-inch strip mill. When this program is completed, company's hot-rolled strip mills will include the following: Eight, 10, 14 and continuous 26-inch mills. No change is contem-





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The back gauge is standard equipment supplied with all Steelweld Shears. Lift-up feature is furnished only for ⅜" capacity machines and larger. Metal cut on lighter machines is usually pliant enough to pass under a gauge without lift-up arrangement.

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plated in company's cold-rolled strip operations.

Philadelphia—Apart from specialties, sheet sellers generally have not gone far toward opening their books for first quarter on non-certified tonnage. Two producers have set up quotas on galvanized sheets for the entire period, but in general mills have not opened books on the major carbon grades beyond February and in some cases not beyond January with arrearages in that month consuming most of the allotment.

Some sellers of electrical sheets and at least one producer of aluminum-coated sheets have filled up their schedules for the first three months of next year.

Deliveries are becoming increasingly extended on straight chromium alloy sheets, with one large mill sold ahead through most of March. Automotive requirements of this grade are especially heavy. Other grades of stainless can be had for shipment early in the first quarter, in some cases by mid-January.

Stove makers are experiencing a continued decline in demand for their more expensive lines. However, they appear to be pressing as hard as ever for enameling stock and cold-rolled sheets on the theory that they could sell more of their less expensive models if they had the steel to build more.

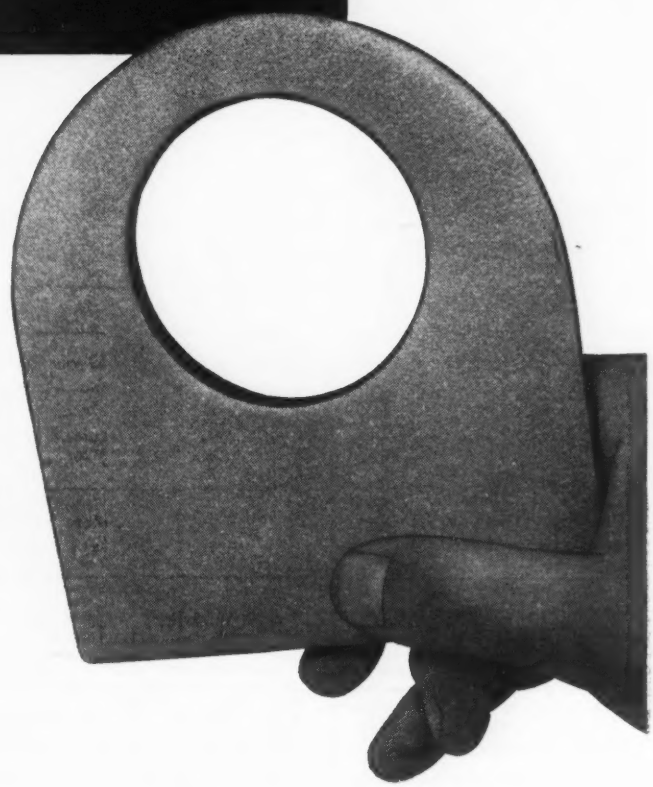
Aviation Supply Office, Navy, Philadelphia, has bids on approximately 658 tons, flat packing case strapping, 5/8 to 1-1/4 inch, various deliveries, and closes Nov. 23 on 445,700 feet of wrought iron pipe.

New York — No easing in sheet supply is in evidence, with mills continuing to turn down heavy tonnages. Most producers have not set up quotas for the first quarter, other than for certified work, beyond January, and in most cases those quotas are comprised largely of arrearages. The furthest that any have gone on hot and cold-rolled sheets, non-certified, is February. Until matters pertaining to voluntary allotments have been clarified, the mills likely will take no action for the entire quarter, even where they are disposed to sell upon such a basis. In galvanized sheets, at least two mills have set up quotas for the entire first quarter, although on a more limited basis than for the current quarter. In some specialties, mills also are selling ahead for the whole 3-month period, where demand prevails. One seller of stainless strip is booked up for the quarter, but still has quite a little capacity available for stainless sheets.

Boston — Shortages and mixed pattern of distribution mark flat-rolled products; adding to confusion are variances in prices in hot-rolled carbon sheets and strip, electrical sheets, stainless and cold-rolled strip. Differing prices in hot strip and sheets center mostly around extras, changes in which were initiated last month by two producers but not generally followed by others. With allocations limited to January and February, some nonintegrated cold strip sellers have not opened books officially for first quarter; when opened, they will be down sharply because of heavy carryovers and will be subject to later adjustment, in line with hot strip deliveries. Where hot material is higher due to extras, cold mills are adding the cost. Outlook for low carbon is clouded. Despite

You don't need to hold up production

..FOR LACK OF A SHAPE LIKE THIS



This bracket is blanked by By-Products Steel Co. from 3/8" plate.

Just this one steel plate shape is used by a manufacturer who specializes on a single farm implement. It wouldn't be economical, therefore, for him to own and operate heavy press equipment because he couldn't keep it busy. One hour's work would stamp out a week's supply of the brackets.

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For Bulletin 270 showing the wide range of work we do, write By-Products Steel Co., Division of Lukens Steel Company, 414 Strode Avenue, Coatesville, Penna.

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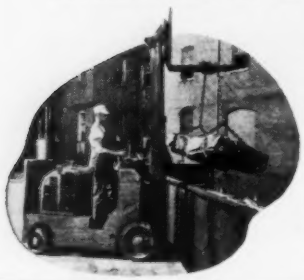
CUSTOMER: Appliance Division, The Cavalier Corp., Chattanooga, Tennessee.

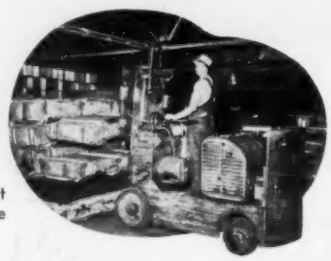
PRODUCTS: Coca-Cola cooler-dispenser, Quaker Oil space heater.

TRUCKS: 6 Baker Fork Trucks—4 2000-lb. and 2 6000-lb. capacity.

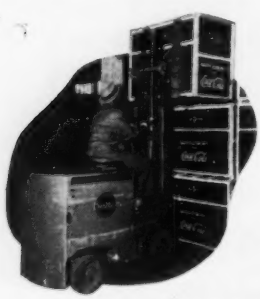


Baker 6000-lb. Fork Truck unloading skidded 6-ton packages of sheet steel from gondola cars with chain sling.

Same truck tiering sheet steel packages in storage department.



OPERATION	TRUCKS USED	RESULTS
Unloading steel sheets in 3-ton skidded packages from gondola cars (50 tons per car). Transporting to storage and tiering.	Baker 6000-lb. Fork Trucks	48 man hours cut to 4. Formerly took 6 men 8 hours for unloading alone. Now 2 men safely unload *and store* a carload in 2 hours.
Handling steel sheets from stores into production line.	Baker 6000-lb. Fork Trucks	More man hours saved. Aisles kept clear.
Handling and storing dies for stamping and blanking departments.	Baker 6000-lb. Fork Trucks	Time and storage space saved.
Moving finished products in cases to storage.	Baker 2000-lb. Fork Trucks	Operation speeded 50%. Warehouse capacity increased 50%.
Moving finished products from storage into boxcars.	Baker 2000-lb. Fork Trucks	16 man hours cut to 1. Formerly took 4 men 4 hours to load a car. Now 1 man does it in about 1 hour.



Baker 2000-lb. Fork Truck tiering cases of finished product in warehouse.

Baker 2000-lb. Fork Truck loading cases into boxcars.

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Baker INDUSTRIAL TRUCKS

slackening in retail demand for some products, there is no easing in steel; in several industries where layoffs have been made there is still pressure for steel, as in case of typewriter assembly plants. Alloy demand is strong, notably for roller chain-making.

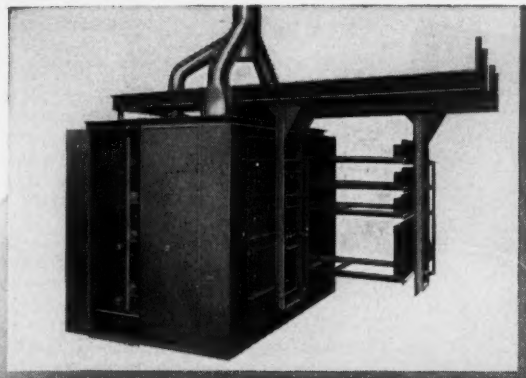
Chicago—A change in the steel situation seems to be in the making, despite the darker outlook for the near future. More soft spots are appearing in industrial production and, while individually these have little significance, a pattern may be in formation by which an orderly retirement from the present abnormally high production levels will come. Pipelines have filled for a wide variety of consumers goods which only last year were difficult to obtain. The reported slowing down in demand for automobiles has not translated itself yet into declining pressure for automotive steels, and it seems probable that autobuilders' clamor for more steel will mount next quarter when carryover tonnage reduces the new period's quotas by roughly one month's production. One district mill has blanked out January for hot-rolled sheets, with other interests' carryovers also approximating that volume.

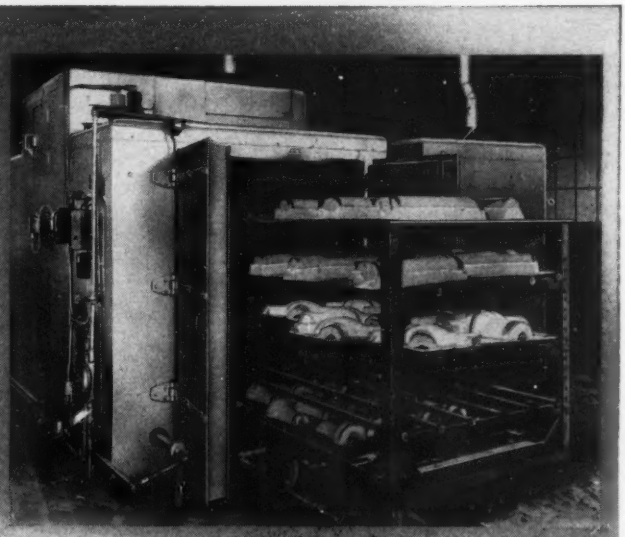
Cincinnati — Sheet mills are trying to complete their first quarter schedules. Handicaps include indefinite tonnage involved in the voluntary allocation programs. Persistence of demand proves the pinch in supplies will not be relieved to any extent. The blast furnace in Martin's Ferry, supplying Newport, Ky., open hearths of the Detrola Corp., is out for 30 days for repairs.

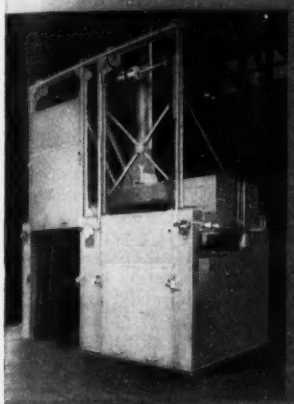
St. Louis — Sheet makers have filled first-quarter allocations cautiously, leaving a margin of safety in the hope of keeping abreast of deliveries throughout next year. Granite City Steel Co., especially, has resolved to keep current. Its production of cold-rolled steel recently has been picking up around 3000 tons each month and reached a probable 21,000 in November. On that basis, the company's new cold reduction mill would reach its 25,000 ton practical capacity in January or February. But orders are not being taken on that expectation, since repairs on a turbine and the slab mill run-out table are due in April. These, plus continuing adjustment difficulties in the new equipment, probably will delay capacity output until spring or later.

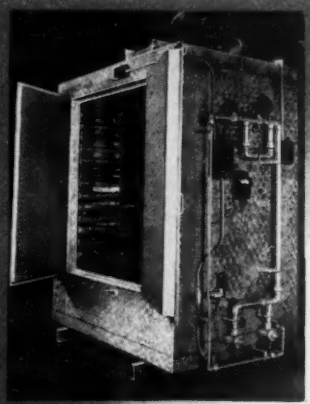
Birmingham — Demand for sheets shows not the slightest tendency to level off. Production holds at virtual capacity, although a considerable proportion of output in the district goes into tin plate.

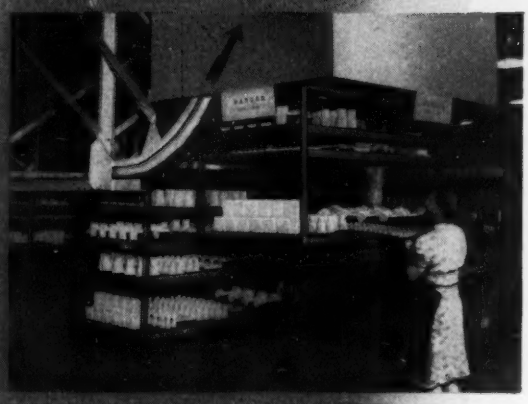
Los Angeles — Hard-pressed suppliers report that sheet continues to be the No. 1 scarcity. Demand is as strong as ever for flat-rolled products, although a minor tapering in new orders is being experienced in some other categories in which supplies come a little closer to meeting requirements. There is a growing feeling that one of the typical characteristics of shortage markets is coming more strongly into evidence here. Suppliers believe that many small users for months past have been taking their full quotas even when current needs declined.

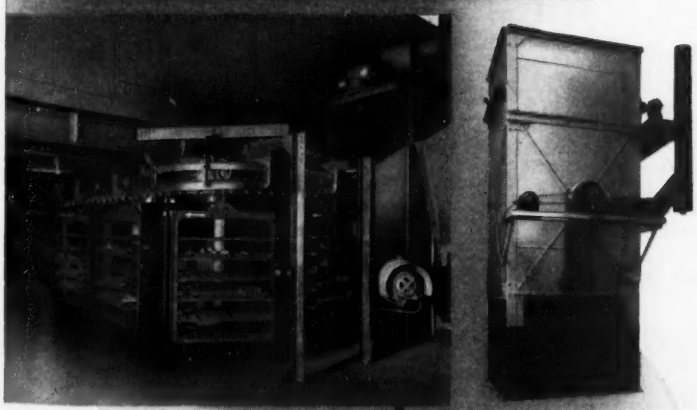












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Plates . . .

Plate Prices, Page 127

New York — Tank fabricators continue to be badly handicapped by the shortage of steel, particularly plates. One large fabricator could handle 60 to 70 per cent more business, if a sufficient amount of steel were available.

At present, there is a seasonal slackening in demand for water tanks and with backlogs so heavy, most fabricators welcome this easing. Most tank fabricators are unable to promise shipments under 12 months, with erection taking anywhere from two to five months in addition. Fabricators' backlogs normally run around two and a half to three months.

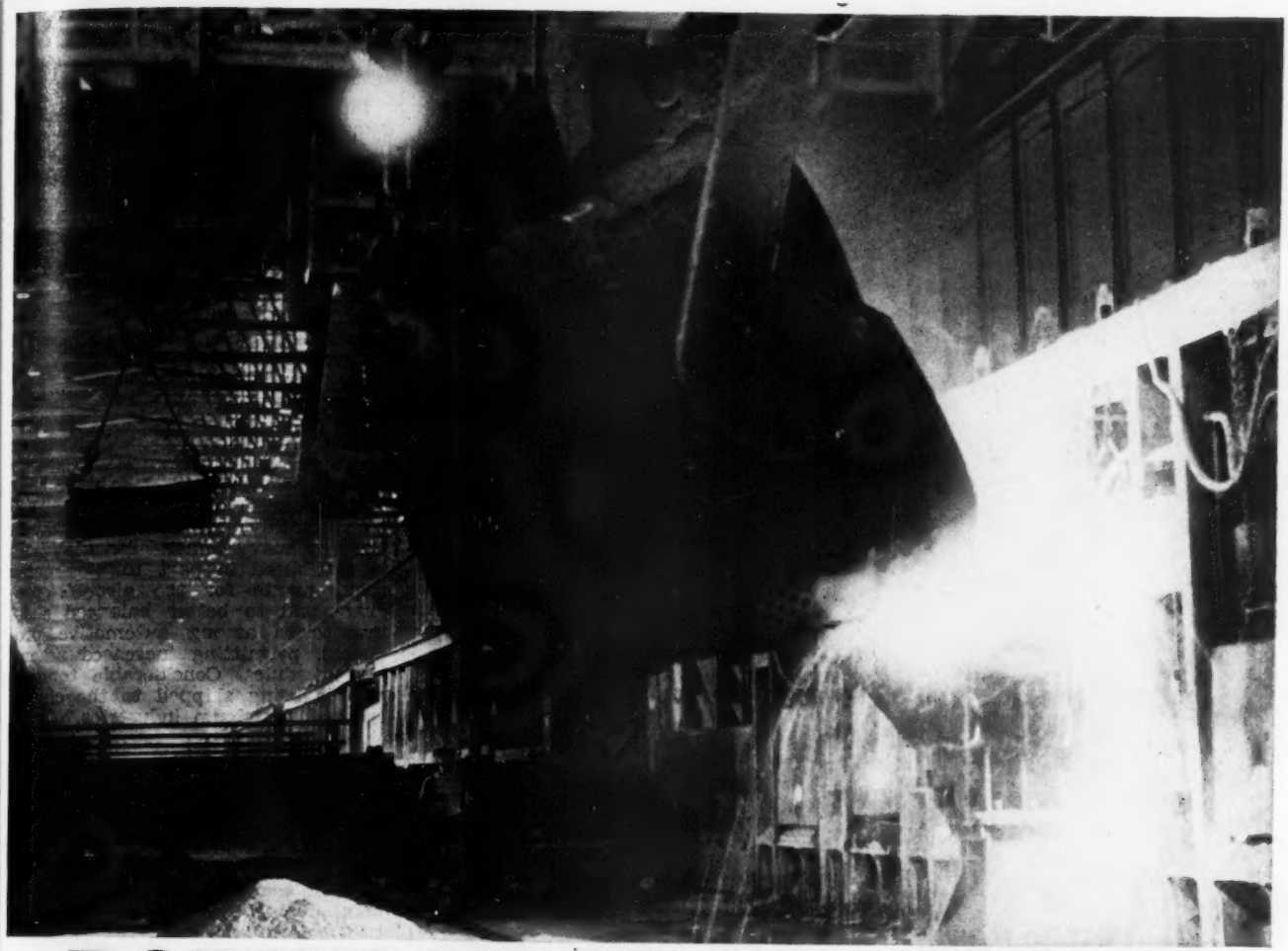
In addition to seasonal influences, demand for water tanks is also adversely affected by extended deliveries and mounting costs.

Philadelphia — District plate mills are operating at the highest level this year, probably at the highest postwar level. However, most mills will have substantial arrearages at the end of this year, averaging perhaps around four weeks' production. Producers generally are not disposed to set up consumer quotas for shipment beyond February, although in some cases tentative assurances have been made for shipments beyond.

Chicago—What specifically was on the agenda for the Steel Products Advisory Committee when it met in Washington last Friday was not clear even to many of the members, but some of those who had concluded after the last meeting that the expiration date of Public Law 395 would preclude putting new programs into operation went back to Washington fully aware that the election outcome could cause an about-face in their thinking that voluntary allocations might soon be a thing of the past. Most noticeably affected by allocations among steel products is plates, and the strengthened position of the program since the election may well presage an even tighter supply situation in this product for nonparticipating industries. The acuteness of this situation makes itself known through various expedients being experimented with as substitutes for carbon plates; thus, high-strength, low-alloy steel has been eyed for its possible use in storage tanks and the like, despite its high cost. Allocations as they now stand have set back one producer's delivery promises on plates from one to two months, and if additional plate consuming industries come into the allocation scheme as the result of the latest advisory group meeting, infinitely greater delays to other users appear inevitable.

Birmingham—Assignment of plate tonnage for first quarter is not completed, although some deliveries have been scheduled through January. Pressure for plates remains as great as ever and the gap between supply and demand remains wide.

Los Angeles—Plate demand is far out-running supply. Consumers have been warned by some suppliers that quotas for next year will be even lower than 1948. Plates and angles are in heavy demand for South American oil field use, but not much material is to be had.



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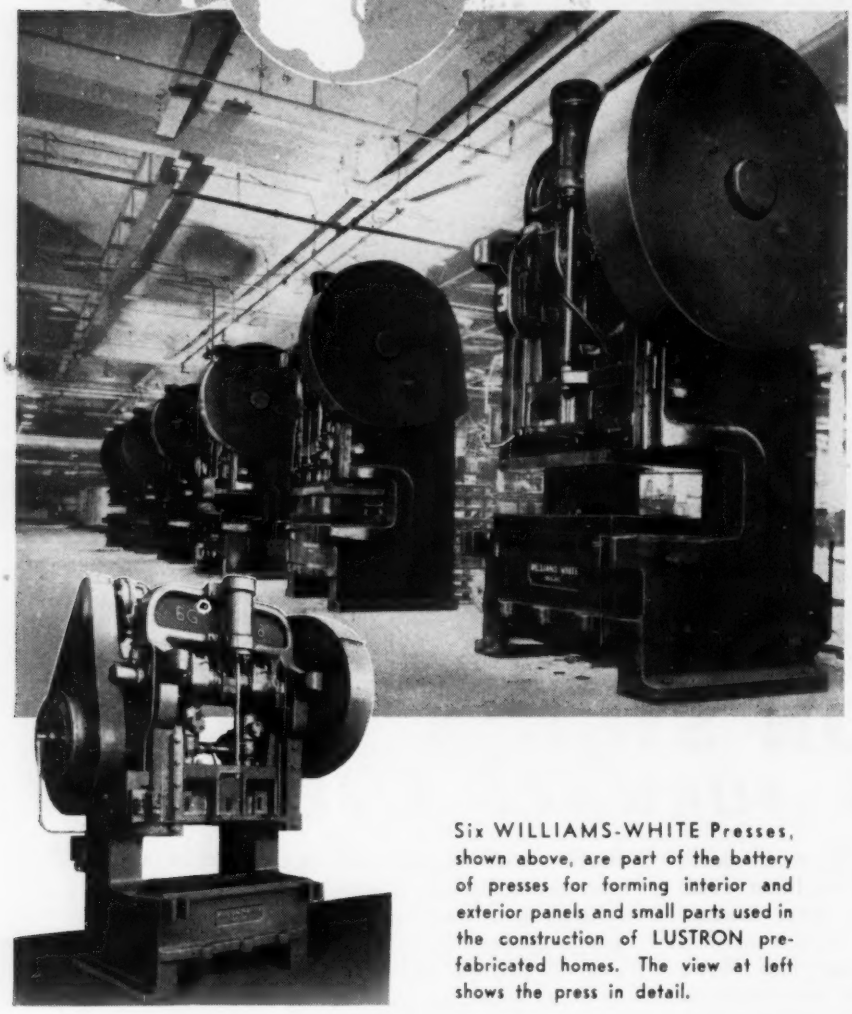

Six WILLIAMS-WHITE Presses, shown above, are part of the battery of presses for forming interior and exterior panels and small parts used in the construction of LUSTRON prefabricated homes. The view at left shows the press in detail.

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MAKERS OF PRECISION PRODUCTION TOOLS FOR NEARLY 100 YEARS

WILLIAMS-WHITE & Co.

MOLINE, ILLINOIS

Steel Bars . . .

Bar Prices, Page 126

Pittsburgh—A growing stability in demand for alloy bars, in contrast to sporadic large tonnage purchases noted earlier this year, is reported by producing interests. However, new bookings continue to surpass production schedules throughout almost the entire range of size classifications. Distribution pattern of alloy steel product shipments has been altered to extent of heavier tonnage commitments under the military allocation program. This program was originally scheduled to get under way during October, but some participants were unable to make the necessary production "lead time." Final approval is expected momentarily for extension beyond Feb. 28 of steel "set asides" (totaling about 102,500 tons monthly) for the armed forces. Current heavy demand for alloy bars is attributed in part to augmented requirements for the aircraft program and to better balanced sheet inventories among automotive producers, permitting increased assembly schedules. Considerable tonnage also is being shipped to the chemical and petroleum industries.

New York — Hot carbon bar sellers in a few cases have set up general consumer quotas for the first two months of next quarter, but most have been unable to set up schedules beyond January, with allowances for arrearages affecting the great bulk of tonnage scheduled for shipment during that month. Some district sellers here claim that customers will receive practically no new tonnage in January.

Cold-drawn carbon bar sellers have long since set up quotas for the entire first quarter, with a number actually having accepted specifications for shipment beyond. Alloy bar business is becoming increasingly extended, with one large producer booked up for the first quarter, except for electric furnace aircraft quality alloys and stainless bars. The latter can be had for shipment within three to four weeks.

Philadelphia — Hot carbon bar demand continues diversified, with sellers moving cautiously in establishing non-certified allotments for first quarter. They have, however, long since set up quotas for the quarter on cold-drawn bars, and in some instances have booked substantial tonnages for shipment beyond.

Seattle — Local bar mills are back to a normal ratio of about 60 per cent reinforcing and 40 per cent merchant bars, this having been reversed during the war when merchant bars were in greater demand. Construction and public works jobs have stimulated the use of reinforcing bars of which sizable backlogs are reported. Plants are making every effort to speed deliveries.

Tubular Goods . . .

Tubular Goods Prices, Page 127

Pittsburgh—Galvanized pipe producers are expected to advance prices $4 per ton to reflect 2 cents per pound advance in prime western zinc to 17½ cents, East St. Louis. Up to mid-week, one leading pro-

ducer, who previously announced policy of tying price of galvanized pipe to that of zinc, was expected to officially take such action by close of last week. Other producers contacted indicated they likewise would take similar action in the near future.

Fretz-Moon Tube Co. Inc., Butler, Pa., advanced standard and extra heavy ⅛-inch galvanized pipe $3 a ton, effective Nov. 18. This action was necessitated by the 2-cent per pound increase in primary zinc and also included adjustment of $4 in prices for ¼ inch and ⅜-inch size classifications.

Los Angeles—Although the petroleum strike is virtually over, and all but one major company have resumed normal operations, there has been no general increase in buying by producers or equipment fabricators to aggravate the already tight supply situation. Next to sheets, pipe is the No. 2 scarcity here and quotas for this item generally will be lower next year. Some eastern mills have temporarily withdrawn from the pipe market in this area.

Wire . . .

Wire Prices, Page 127

New York — First quarter wire allocation schedules are jelling slowly; indications are there will be no increase in overall quotas, but some producers look for slight easing in pressure. For aircraft and welding electrodes, trend is up; backlogs for the latter are higher and growing. On the other hand, bedding and upholstery spring material remains in the dumps and on the whole a more spotty situation appears in the making. Declines are balanced by excess demands in other directions and there is no evidence of any material slackening. Inquiry for nail wire is strong, notably 10 gage; more new producers have acquired nail machines, but they are experiencing trouble in getting wire to feed them. Rod allocations over the next few months will approximate tonnage of this quarter; some Swedish rods are being finished and more are on order.

Boston—Considerable wire tonnage awaits definite assignment in first quarter schedules with mills operating on a monthly basis in February; in most carbon products there is ample tentative volume up for lead-time. There are a few soft spots, as in bedding spring wire; music wire is available from stock on more sizes and grades. Capacity for the latter is far above pre-war and the same is true of rope wire. Delivery on the latter grades is near normal and demand for rope is fair. Here also war-built capacity is a factor with 22 companies forming rope; competition is keen and the margin limited. Automotive requirements hold at high levels with pressure for valve spring material heavy. Brush requirements are holding with full allocations being taken. Heading grades continue tight, notably in the middle size ranges.

Chicago — With farm and industrial demand for wire and wire products maintaining its high level, some industries cite this shortage as being an important factor in their output projections for next year. For example, an official of the National

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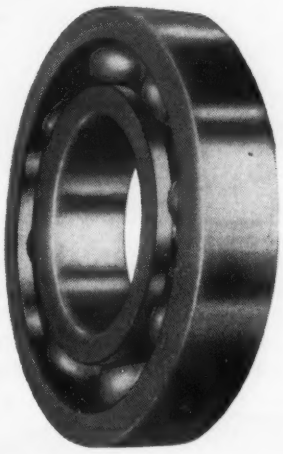

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Association of Bedding Manufacturers last week predicted that if overall domestic consumption of steel continues at present levels his industry will lack about 30 per cent of its steel needs. No shortages have been sufficiently acute to slow down the industry appreciably this year, he said, but rising prices of materials used by the industry is one of its chief problems at present.

Birmingham — Some slackening in demand for wire is reported, probably due to inclement weather which has hampered agricultural work. In other quarters demand remains heavy and is estimated at more than 5 per cent above available tonnage.

Structural Shapes . . .

Structural Shape Prices, Page 127

Philadelphia — While structural fabricators have substantial backlogs and are not getting sufficient quantities of steel to reduce them materially, new buying is spotty, due principally to seasonal influences and to high construction costs. Some builders have temporarily postponed going ahead with commercial construction and a few have held up programs indefinitely, with the latter claiming that costs have reached the point where they are more than the projects are worth. Bids on public work have exceeded appropriations with little prospect of construction going ahead for some time.

Boston — Power plant expansions are the backbone in structural demand for private construction, but on the whole new estimating and inquiry is down. Structural shops are constantly pressing for additional tonnage, but without success with one supplier cutting December allocations 50 per cent. Belgium structurals are being offered more freely at prices well over domestic quotations.

Los Angeles — New construction apparently has passed its peak, but demand is still far in excess of the limited supplies. Price resistance is making itself felt, and some construction is being delayed in the hope that costs can be shaved. In one respect, this is beneficial, for it relieves some of the pressure on structural materials.

Warehouse . . .

Warehouse Prices, Page 129

Pittsburgh—Pattern of warehouse steel demand has recorded relatively little change in recent weeks. Restricted inventories continue to be distributed under a strict allotment basis, despite constant pressure from mill customers seeking to supplement their steel stocks through purchases from distributors. Most warehouse interests report steel inventory position as of Nov. 1 was moderately below that recorded Oct. 1, and expect this trend to continue through remainder of this year. This belief is based on reports from mill suppliers to effect that not all tonnage previously scheduled for November and December shipment can be fulfilled. In some instances this carryover tonnage has been canceled outright, while in others the mills have limited order acceptance for January and February rollings to absorb this tonnage.

Birmingham — Warehouse stocks of steel in this district remain precariously low and considerably below current normal needs, which makes it out of the question to even approximately meet today's high demands. Sheets and plates are reported as particularly scarce.

Los Angeles—Although requirements are far in excess of supply, and no product category is generally available in anything like adequate quantities, steel jobbers report a slight flattening off in the size of new orders. Demand for some products from these houses currently is off from 5 to 10 per cent. Price resistance is pronounced in structural shapes and, despite the short supply, customers are hesitant when offered this material at premium prices.

Seattle — Jobbers are making the best of a bad situation due to interrupted water shipments, lowered allocations for the first quarter and cancellation or deferment of essential items, adding to the difficulty of serving the trade satisfactorily. Inventories are low. Demand is strong for all items. In some instances, jobbers have turned to new sources of supply. Meanwhile all shipments are coming overland at higher freight costs. Stainless steel sheets are reported in fair supply.

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Pig Iron . . .

Pressure eases, although needs still exceed supply. Foreign iron prices dip

Pig Iron Prices, Page 128

Philadelphia — Pig iron is under a little less pressure, although requirements still exceed supply. Overall domestic production of iron is heavier and, while the longshoremen's strike has disrupted import shipments, the outlook is for continued relief from abroad, and at lower prices. Also contributing somewhat to easing pressure for iron is increasing spottiness in demand for gray iron castings. Foundries mostly affected are small jobbers, particularly those relatively new in the field. Some are very definitely beating the bushes for new business.

Allied Iron Inc., Chester, Pa., which is to operate the furnace acquired from the government at that point, is nearing completion of repairs and improvements and is expected to get into production around Dec. 1, or shortly thereafter. The iron is to be used principally for conversion into skelp for the manufacture of pipe for Texas oil interests. Skelp is to be rolled in the Pittsburgh district, according to persistent reports. However, there have been some indications that at least some of the early iron to be produced at this furnace may move into the merchant trade.

Foreign iron prices continue to ease, although reports concerning some are difficult to check, because specifications involved cannot always be easily established, nor can the conditions surrounding the contracts. Trading deals (foreign iron for plates, for instance) often throw additional light on some of the reported prices.

Actual date of transaction is another factor that often makes for confusion. Recently some Australian iron was reported due in the East at $60 c.i.f. In at least this one instance, the transaction was made last January, with the intervening market higher. There are still other factors that enter into these foreign purchases which sometimes prove to be misleading in appraising the import market.

Dutch iron is now being offered at around $71 or $72, c.i.f. eastern seaboard, but the iron is off-grade iron and is being definitely sold as such. Hence, this price is not representative of the foreign market for prime material. Prices are off a bit from earlier sales of iron of the same quality. Generally speaking, the foreign market on prime iron now averages around $85. Steelmaking grades, sold usually in round tonnage, are coming in at around $80, c.i.f., or a shade under. Foundry grades, sold generally in small lots, average $85, or a little higher. At least two or three cargoes of foreign iron have been tied up in the East as a result of the waterfront strike, with other cargoes now enroute likely to be subject to the same difficulty unless the labor dispute is settled promptly. Further sailings from the other side have been postponed, pending settlement of the strike.

Boston — Improvement in pig iron supply continues. Mystic furnace is now producing malleable after relieving critical needs for No. 2 foundry. In a few instances shops are able to increase iron ratio of iron in melts, but percentage of scrap in mixtures is still abnormally high. Melt is off slightly and there is less snap to new volume; subcontracting has dwindled to usual volume which includes some normal farming out of castings by textile mill equipment builders. Foreign iron prices are lower with tonnage offered at around $72 Boston, $10 to $15 below the peak at which most tonnage was bought late in the summer; with domestic supply improved, this is still too high for most melters.

New York — Most district consumers are still pressing for iron, but the overall situation is not quite as stringent, due in part to a somewhat better supply and also to the fact that some foundries have less tonnage in prospect. Some foundries, in fact, are more active in their efforts to line up new business than at any time in recent years. In certain cases they have reduced their weekly schedules by a day or so.

Pittsburgh—Emphasis on improvement in coal quality, which would result in better metallurgical coke, is believed most logical path to follow during this period of critical pig iron

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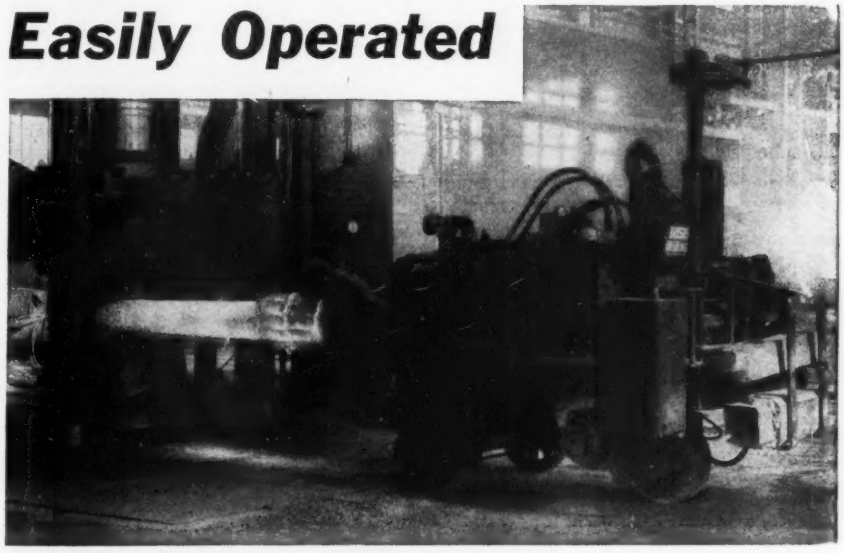

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shortage. Adequate supply of high quality coke would make possible increased pig iron output throughout the country equivalent to about five new blast furnaces. Construction of elaborate coal washing facilities is nearing completion at the Robena mine of H. C. Frick Coke Co. in Greene county, Pennsylvania, while erection of similar facilities for large tonnage coal washing also has been undertaken by Jones & Laughlin Steel Corp. and other steel producers.

Birmingham — Pig iron supplies in the South, especially as concerns foundry requirements, continue wholly inadequate. Not a great deal is heard from consumers, since most of them apparently have come to realize the futility of expecting more. Production of iron by merchant melters is at capacity.

St. Louis — Missouri-Illinois Furnaces Inc. has achieved its former 1000-ton daily pig iron production rate following relining of one furnace. New rated capacity is almost 100 tons more than the 1000-ton figure, and officials hope to reach and establish the new capacity in December. Production is equally divided between basic and foundry iron. Pig customers are back to their former allocations and all of their reasonable demands are being met. The clamor for increased allocations is abating somewhat, but foundries are not yet building inventories. Most foundries which cut schedules from a five to a four-day week have returned to their old schedule.

Scrap . . .

Stronger price tone develops in Buffalo market with blast furnace grades advancing

Scrap Prices, Page 132

Buffalo — Midweek sales of blast furnace scrap items, aggregating about 10,000 tons at prices ranging from $1 to $2 a ton above the formula, broke the prolonged stalemate in the local market. However, the deadlock between leading mills and dealers continued in steelmaking grades as bids remained at the formula.

Three of the leading consumers of blast furnace scrap entered the market simultaneously to place substantial orders at the advanced prices. Turnings rose to a range of $38 to $38.50 a ton, while short shovelings commanded $40 to $40.50. A few thousand tons of No. 1 cupola cast changed hands at $66, or within the prevailing range of $65.75 to $66.25.

Further indications of a firmer market appeared when a leading mill revealed that unprocessed scrap was being taken in with No. 2 material at a price $3.50 a ton below the formula; unbundled scrap at $4 below formula. These prices were considered bullish in view of the fact that processing usually is figured on the basis of $5 a ton. There were also further reasons for considering present quotations on steelmaking grades, both here and elsewhere, as being of a nominal nature, because of the tremendous amount of conversion business going on at higher prices. Dealers admit moving large quantities of material in such deals.

Boston — Cast scrap prices are slightly easier with premiums for open-hearth tonnage less frequent. There are no open breaks in any grade but the keen edge for scrap has been dulled at least temporarily. Several larger consumers of cast are not buying and inventories with some melters are best in months. Cast is still selling at higher prices than pig iron and the usual differential between these raw materials is at least reversed. While pig iron supply is less critical, available tonage is not sufficient to seriously bend price curve for cast.

Philadelphia — The leading eastern scrap consumer last week had two cargoes of scrap tied up as a result of the longshoremen's strike, one here and the other at New York. Unless there is early adjustment, the unloading of at least five other cargoes for this interest is likewise going to be delayed. The first cargo of German scrap to be received in this country for the account of United States Steel Corp. subsidiaries, and noted as arriving here recently, was not completely unloaded before the strike hit this port. This waterfront difficulty has given the market on steel scrap a slightly stronger undertone, although it is not reflected in higher prices. In fact, the market on all principal grades of scrap, steel and cast iron, is unchanged, except for a slight increase in short shovel turnings, which are now holding at $38.50-$39, delivered.

A reduction in freight rates on imported scrap from the eastern seaboard to Johnstown, Pa., and Pittsburgh, is slated for Dec. 13, although an appeal has been made to put the new proposed rates into effect sooner on one to five days notice. The new proposed rates from Philadelphia to Johnstown are $6.98, against the current rate of $8.11; from Philadelphia to Pittsburgh, $7.58, against $8.74.

New York — Scrap brokers' prices are steady, although sentiment is a shade stronger momentarily as a result of delay in the handling of foreign scrap because of the longshoremen's strike. Unloading of several cargoes was held up last week and the near approach to these shores of several others promises further difficulty unless the labor dispute is promptly adjusted. Some unfortunate experiences have been had with German scrap recently at the mills. While the tonnage in the main has been regarded as of good quality, some live shells have been inadvertently included in the material, causing some damage to furnaces. As a result, material is being carefully screened.

Chicago — Scattered grades of scrap were bringing higher prices last week, with rerolling rails and electric furnace bundles up $2, and No. 1 wheels and 18-inch and shorter rails up $1. Movement of scrap to open hearths and to cupolas continues steady and in large enough volume to permit building up of inventories. Mills' stocks are believed sufficient now for about a full quarter's operations and very little pressure is being exerted for increased tonnage. Foundry demand continues to sustain the prices for its grades. The relief

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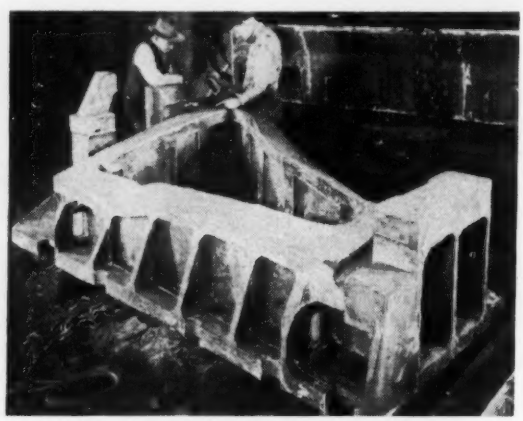

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which imported scrap brings to the eastern supply is sufficient to obviate the need for at least one company making an effort to buy foreign material directly.

Cincinnati — Scrap is moving steadily, and in most instances, at unchanged prices. Railroad specialties are off several dollars from recent levels and a few other grades show fluctuations. Foundry grades are, in the main, firm although buying interest has dimmed because of comfortable inventories. Open-hearth grades are at formula.

Pittsburgh—Major consumers have not been accepting all the scrap tonnage offered in recent weeks because of fairly good inventories. Some interests are not buying any more scrap than is necessary on the possibility of lower price levels within the next 60 days. One large producer purchased around 2500 tons of blast furnace turnings recently at $39 with no springboard involved. This item had been moving within a price range of $39.50 to $40, plus 25 cents springboard. However, smaller mills are still reaching out for scrap from remote points. Supply of cast scrap items remains well below immediate needs, despite a substantial reduction in order backlogs among many gray iron jobbing foundries.

Birmingham — Open-hearth scrap prices remain unchanged, but efforts are under way to build up inventories where possible. Some sources anticipate an upward trend in prices soon.

St. Louis — A delayed fall pickup in scrap shipments is finally allowing mills to accumulate winter reserves. For the first time this season receipts are substantially ahead of their daily melt. Mill stocks are 60 days or better, and foundries are in nearly as good position. A few melters are having trouble finding space to stockpile the incoming scrap.

Dallas — Scrap prices remain unchanged and continue firm despite generally low supplies and a comparatively slow market. While most yards' inventories continue on a basis of current needs, supplies are available to handle orders. The fact is, scrap dealers are not being flooded with orders.

Houston — Supplies of scrap in this area remain fairly good but are barely beyond current needs. Prices are not expected to change soon. Only in isolated cases has there been any difficulty in obtaining gondolas.

Los Angeles — Prevailing quotations are unchanged, but there is an easier undertone in No. 1 cast, and dealers are not paying over-the-market prices. Considerable tonnages are coming in, largely from Geneva, and foundries for the time being are obtaining ample supplies. Users here are desperate for steel-making scrap, for requirements have developed much faster than the ability of scrap suppliers to keep up.

Seattle — The market was caught off balance last week by Columbia Steel Co.'s announcement of the appointment of Luria Bros. Inc., Philadelphia, as the former's exclusive agents in the buying of scrap.

As a result the market moved up and receipts dropped, as shippers awaited possibly higher prices. Meanwhile prices fluctuated, generally upward, and the market might be rated at $27.50 to $29.00, f.o.b. plant.

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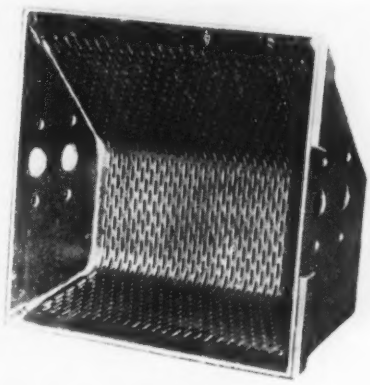

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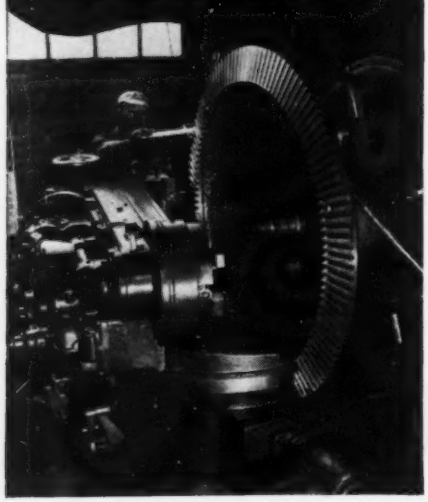

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Rails, Cars . . .

Track Material Prices, Page 127

Chicago — Simultaneously with the Nov. 15 increase in No. 1 quality tee rail prices to $3.50 per 100 pounds, f.o.b. Indiana Harbor, Ind., Inland Steel Co. revised its weight extras on tee rails to 15 cents per 100 lb for rails weighing less than 100 lb to 90 lb, inclusive, and to 30 cents for rails of less than 90 to 75 lb, inclusive. These extras previously had been 2-1/2 cents and 10 cents, respectively.

Joint bars weighing under 60 lb per pair, to and including 50 lb, now carry a weight extra of 45 cents per cwt, as against 25 cents formerly. Joint bars in the range of under 50 lb to and including 40 lb per pair now take an 80-cent weight extra, compared with 50 cents formerly; and for joint bars of less than 40 lb weight per pair weight extra now in force is $1.20, compared with 75 cents, the extra previously in effect.

Extras on joint bars of special sections as modified in the press have been revised as follows: Joint bars, oversized not exceeding 1/32-in., from 5 cents to 10 cents; crowned not exceeding 1/32-in., from 5 cents to 10 cents; both oversized and crowned, total height not exceeding 1/32-in., from 5 cents to 10 cents. Extras on joint bars with lateral center overfill and/or head easement remain unchanged at 5 cents per cwt. Extras on joint bars which are otherwise modified in the press will be given upon application.

New York — New York Central will close bids Nov. 30 for diesel electric locomotives, contract No. 36; also for track fastenings, contract No. 33. This carrier will also close bids Dec. 1 on structural steel castings for bridge No. 338, Cincinnati district, contract No. 35.

Canada . . .

Toronto — F. K. Ashbaugh, Canadian Steel Controller, stated that Canada's critical steel shortage has forced the country to start a worldwide search for scrap. Canadian trade representatives in Hong Kong, Singapore, Australia, Japan, South America and Germany have been asked to buy whatever is available. So dark is the picture, all Canadian industry and construction, with the exception of housing, is pinched.

To the man in the street the shortage is a vague and uncertain problem, but it might become real to him in shortages of Canadian built automobiles, refrigerators, stoves and furnaces if the dearth of steel continues for any length of time. These industries have been asked to "fend for themselves," to buy steel wherever they can until the problem is solved.

One gleam of hope is in the Montreal report of an electric steel refining process that cuts the job from 24 hours to 30 minutes. But the "refining-by-electricity" process, still in its pilot stages, is a revolutionary process for the future. What is needed, said Mr. Ashbaugh, is about $20 million worth of blast furnaces, coke ovens and open hearths as soon as possible. The biggest news for Ontario is that a $15 million blast furnace may be built in that province. One location under consideration is Sault Ste. Marie.

A Cabinet spokesman in Ottawa stated that the Government is prepared to "shoot the works" on costs, and is prepared to subsidize steel construction costs. "It will do anything within its power to alleviate the shortage." The government also has ordered Trade Department supervisors to survey Canadian scrapyards for an estimate of what can be made available to the steel industry. Canada's current steel shortage is estimated at 1 million tons of ingots a year, that of scrap, 200,000 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2200 tons, steel towers, transmission lines, Union Electric Co., St. Louis, to Lehigh Structural Steel Co., Allentown, Pa.; Stone & Webster Engineering Corp., Boston, contractor-engineer.

980 tons, warehouse, Amstrong Cork Co., Lancaster, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

925 tons, addition, boiler house, New Bedford Gas & Edison Co., New Bedford, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.

575 tons, New York Central station, Toledo, O., to Bethlehem Steel Co.

520 tons, brazing beams, sewage development, Detroit, to American Bridge Co., Pittsburgh, Pa.

400 tons, addition, Public School 124, Bronx, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

400 tons, addition, Public School 246, Brooklyn, N. Y., to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

345 tons, Lawrence Hospital, Bronxville, N.Y., to Bethlehem Steel Co.

315 tons, laboratory, Allen B. Du Mont Co., Clifton, N. J., to Bethlehem Steel Co.

250 tons, deck and moving facilities, Texas Co., Westville, N. J., to Bethlehem Steel Co.

240 tons, plant addition, Procter & Gamble Co., Cincinnati, through Day & Zimmerman, Philadelphia, to Bethlehem Steel Co., Bethlehem.

230 tons, state bridge, Schuylkill county, Pennsylvania, to Bethlehem Steel Co.

225 tons, Washington state bridge, King county, to Poole, McGonigle & Dick, Portland, Oreg.; general contract to Pacific Northern Construction Co., Bremerton, Wash.

200 tons, state bridge work, Westchester county, New York, through Garrofano Construction Co. to Bethlehem Steel Co.

175 tons, shopping center, Washington, through Eldrisco Construction Co., to Bethlehem Steel Co.

165 tons, state bridge, Lackawanna county, Pennsylvania, to Pine Brook Iron Works, Scranton, Pa.

150 tons, 6-story apartment, 240th St. and Dash Place, New York, to Grand Iron Works Inc., that city.

130 tons, building, Merck & Co., Elkton, Va., to Roanoke Iron & Bridge Works Inc., Roanoke, Va.

100 tons, transmission towers for Bonneville Power Administration, Reedsport, Oreg.; to Schmitt Steel Co., Portland.

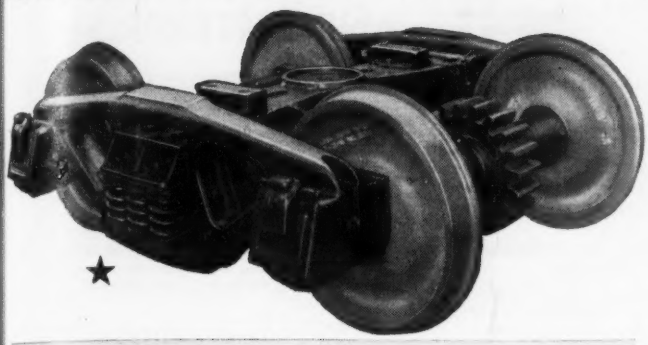
STRUCTURAL STEEL PENDING

2700 tons, section, municipal ferry terminal, St. George, Staten Island, N. Y.; Bethlehem Steel Co. low bidder.

765 tons, angles and channels, including 75 tons wide flanged beam, corps of engineers, Kansas City, Mo., inv. 108, bids Nov. 23; also 627 tons, plates, including wide, cover and gussets.

875 tons, shop buildings, General Electric Co., Pittsfield, Mass.; Charles T. Main Inc., Boston, engineers.

SWING WITHOUT SWAY... BROWNING CRANES ARE BUILT THAT WAY



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One-Piece Steel Casting for all deck machinery.

BROWNINGS rotate fast with minimum sway, give you maximum production with bucket, magnet, grapple or hook. This stable crane assures accurate load spotting.

And with a Browning you *see* while you swing. True full vision from the cab is another feature of the M-Series Diesel Locomotive Cranes.

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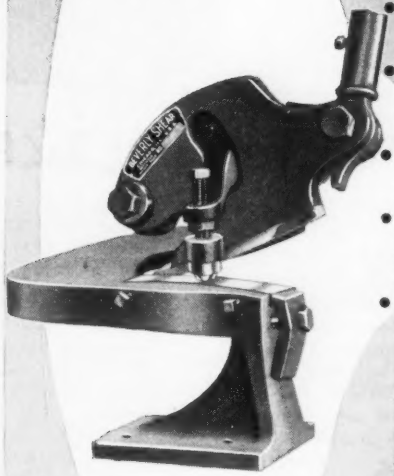

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- Free-cutting . . . handles lightest material without distortion.
- Compound leverage . . . great power with little effort.
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The BEVERLY SHEAR MFG. Co.
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Chicago 43, Ill.

300 tons, also 80 tons reinforcing bars, Bureau Public Roads bridge, Mt. Hood national forest, Oregon; bids to Portland, Nov. 30.

300 tons, factory building, Philco Corp., Philadelphia, for erection in Sandusky, O.; bids asked.

180 tons, garage, Cincinnati Gas & Electric Co., Cincinnati; bids asked through Day & Zimmerman, Philadelphia.

160 tons, addition, Enola diesel engine house, Pennsylvania Railroad, Harrisburg, Pa.; bids closed Nov. 17.

Unstated, addition to Alcoa plant, Vancouver, Wash.; plans out.

Unstated, miscellaneous items, sch. No. 2468; bids to Bonneville Power Administration Nov. 12.

Unstated, U. S. Steeel I Beam-Lok or Irving type steel decking for Broadway bridge; bids to county commissioners, Portland, Oreg., Nov. 18.

REINFORCING BARS . . .

REINFORCING BARS PLACED

100 tons, Gorge diversion dam, Seattle's Skagit project, to Bethlehem Pacific Coast Steel Corp., Seattle; general contract to Cascade Contractors Inc. and A. V. Phillips, Seattle, joint low bidders, $967,553.

REINFORCING BARS PENDING

123 tons, substructure state Clearwater river bridge, Lewiston, Idaho; bids called Nov. 19.

Unstated, 1½ million gallon municipal water reservoir; bids to Ellen Martin, city clerk, Milwaukie, Oreg., Dec. 13.

PLATES . . .

PLATES PLACED

2000 tons, three tanks, Buckley Development Co., Bridgeport, Conn., to Bethlehem Steel Co.

300 tons, tanks, Webber Oil Co., Bangor, Me., to Hammond Iron Works, Warren, Pa.

RAILS, CARS . . .

LOCOMOTIVES PENDING

Northern Pacific, four 5400-horsepower diesel-electric passenger locomotives; directors authorize company to purchase.

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 250 seventy-ton hopper cars and 50 mill-type gondola cars, to own shop.

Chicago, Milwaukee, St. Paul & Pacific, 3880 freight cars, to own shops; list comprises 2330 gondola, 1000 box, 500 flat and 50 caboose cars.

Chicago, Rock Island & Pacific, 1000 seventy-ton gondola cars, to own shops.

Merchants Dispatch Transportation Corp., sixty 55-ton refrigerator cars, to own shop, East Rochester, N. Y.

Missouri-Kansas-Texas, 25 caboose cars, to own shops.

RAILROAD CARS PENDING

New York Central, maximum of approximately 6900 freight cars, bids Dec. 3; inquiry involves: 25 to 200 covered hoppers; 150 to more than 3000 fifty-five-ton all steel hoppers; 100 to 200 seventy-ton high side, drop-end gondolas; 500 to 1500 drop end gondolas, with wood flooring; 500 to 1500 high side drop-end gondolas; and 500 flat cars with wood flooring. The equipment includes requirements of the Pittsburgh & Lake Erie, Indiana Harbor Belt Line and Peoria & Eastern, New York Central subsidiaries.

Northern Pacific, 950 freight cars, directors have authorized company to acquire equipment; proposed list comprises 250 fifty-ton drop-bottom gondola, 250 fifty-ton hopper, 250 refrigerator and 200 seventy-ton ore cars.

RAILS PLACED

Reading Co., 25,000 tons of rail, to Bethlehem Steel Co.

For BIGGER Carburizing Box Payloads

Handle more parts per load to boost production and reduce unit costs. Stanwood Engineering is automatic assurance of top to bottom design that holds weight to a minimum without sacrificing strength. The all-fabricated carburizing box shown is STANWOOD-DESIGNED to resist high temperatures and corrosion and to stand up under the roughest handling. Yet it is extremely lightweight for BIG payloads. There are no corner welds . . . Long-life V-skids on bottom permit free air circulation Send for catalog 16 describing Stanwood baskets, trays, fixtures, retorts and carburizing boxes.

Stanwood Corporation
4825 W. Cortland St. Chicago 39, Ill.
FABRICATED METAL PRODUCTS

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

LOS ANGELES—John Morrell & Co., 1333 Willow St., is planning to make a $140,000 addition to its meat packing plant; H. Roy Keller, 3723-A Wilshire Blvd., architect.

SAN FRANCISCO—Edward E. Conn Saw & Tool Works has been incorporated with a capital of $125,000 by Edwin J. Conn, Atherton; Lester T. Conn, Menlo Park; and Russell T. Conn, San Francisco; representative is John G. Evans, 703 Market St., San Francisco.

SAN MATEO, CALIF.—Thermo-Steel Products Corp. has been formed with a capital of $500,000 by Ulyss S. Mitchell and Viola E. Mitchell, San Mateo, and Joseph W. Bernal, Berkeley; representative is Bernal & Bernal, Bank of America Bldg., Berkeley.

LOUISIANA

OPELOUSAS, LA.—Humble Oil & Refinery Co., 1216 Main St., Houston, Tex., has awarded a $4 million contract to Hudson Construction & Engineering Co., 2711 Danville St., for construction of a refinery.

MARYLAND

BALTIMORE—American Radiator & Standard Sanitary Corp., 5315 Holabird Ave. has awarded a $150,000 contract to Morrow Bros. Inc., 2315 N. Charles St., for construction of a plant.

MASSACHUSETTS

CAMBRIDGE, MASS.—Mauck-Hill Corp., c/o John W. Galbreath & Co., agent, 42 E. Gay St., Columbus, O., has awarded a $300,000 contract to Turner Construction Co., Newbury St., Boston, for construction of a warehouse with office space and garage on Vassar St.; Charles Greco, 11 Beacon St., Boston, architect.

MINNESOTA

CHISHOLM, MINN.—Oliver Iron Mining Co., 700 Wolvin Bldg., Duluth, is planning to build two $500,000 locomotive and repair shops; one at Monroe open-pit mine and the other at Sherman open-pit mine.

MISSOURI

INDEPENDENCE, MO.—Gleaner Harvester Corp., Cottage and Hayward Sts., has awarded a $500,000 contract to Swenson Construction Co., 3305 Terrace St., Kansas City, Mo., for construction of a manufacturing plant; E. W. Tanner & Associates, 310 Ward Parkway, Kansas City, architects.

NEBRASKA

SEWARD, NEBR.—Seward County Rural Public Power District has awarded a $16,000 contract to the Foree Electrical Construction Co., 502 National Bank of Topeka Bldg., Topeka, Kan., for labor in connection with the construction of 198 miles of rural electric lines, materials costing $110,000 to be provided by the cooperative; Henningson Engineering Co., Standard Oil Bldg., Omaha, consulting engineers.

NEW JERSEY

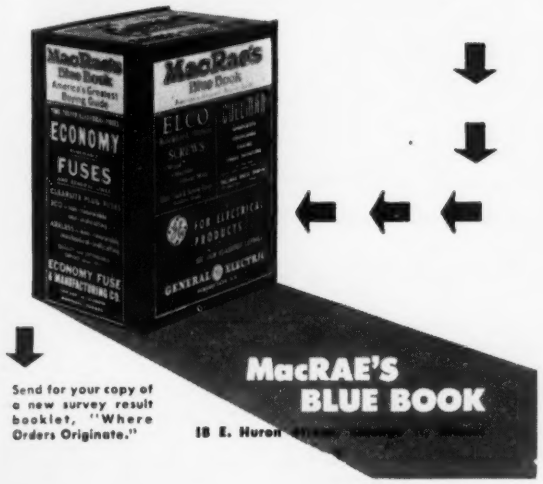
BELLEVILLE, N. J.—Mauck-Hill Corp., c/o John W. Galbreath & Co., agent, 42 E. Gay St., Columbus, O., has awarded a $300,000 contract to Turner Construction Co., 420 Lexington Ave., New York, for erection of a warehouse with office space and garage; William Higginson & Son, 101 Park Ave., New York, architects.

NEW YORK

BUFFALO—Lehigh Valley Railroad plans to build facilities costing $500,000 for servicing diesel-powered freight locomotives in the Tifft Street Terminal yards.

NEW YORK—Mauck-Hill Corp., c/o John W.

At 9 out of 10 of the largest and most important decision points in American industrial purchasing, MacRAE'S BLUE BOOK is used as a reference source "principally" or "exclusively."



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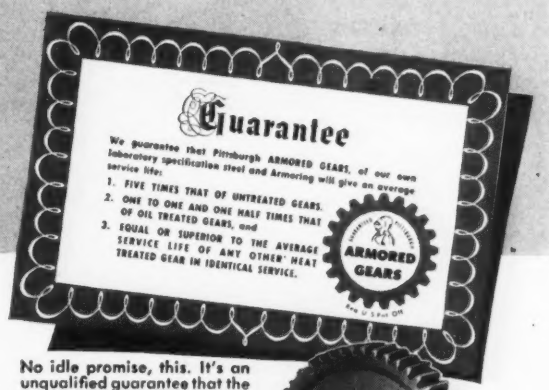
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We guarantee that Pittsburgh ARMORED GEARS, of our own laboratory specification steel and Armoring will give an average service life:
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2. ONE TO ONE AND ONE HALF TIMES THAT OF OIL TREATED GEARS, and
3. EQUAL OR SUPERIOR TO THE AVERAGE SERVICE LIFE OF ANY OTHER HEAT TREATED GEAR IN IDENTICAL SERVICE.
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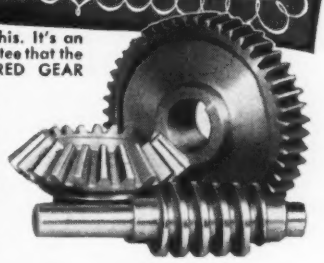

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WHEELING, WEST VIRGINIA

TIN PLATE
COP-R-LOY PIPE-SHEETS
Ductillite
THE MODERN TIN PLATE

WHEELING STEEL

Galbreath & Co., agent, 42 E. Gay St., Columbus, O., has awarded a $300,000 contract to Turner Construction Co., 420 Lexington Ave., for construction of a warehouse, with office space and garage on 140 St. and Walton Ave.

OREGON

PORTLAND, OREG.—Schmitt Steel Co., 2765 N. W. Nicolai St., is planning to construct a plant; Moffatt, Nichol & Taylor, Concord Bldg., consulting engineers.

TENNESSEE

MONSANTO, TENN.—Monsanto Chemical Co. will construct a $750,000 washing unit at its phosphorous plant to eliminate fluorine gas present in smoke from the plant.

TEXAS

BAYTOWN, TEX.—General Tire & Rubber Co. plans to expand its rubber plant to include manufacture of cold process rubber and a refrigeration plant at a cost of $1,200,000.

BEAUMONT, TEXAS—Bethlehem Steel Co., E. C. Retchin, general manager, plans an expenditure of $3 million during 1949 for expansion of its facilities which will include a $1 million drydock.

HOUSTON, TEX.—Goodyear Synthetic Rubber Corp., LaPorte Rd., is planning to expand its rubber plant to include manufacture of cold process rubber and a refrigeration plant at a cost of $1 million.

PORT LAVACA, TEX.—Aluminum Co. of America is planning to build a $3 million aluminum plant including an administration building, engine houses, cafeteria and store building; Wyatt C. Hedrick, 5201 Fannin St., Houston, engineer and architect.

PORT NECHES, TEX.—United States Rubber Reserve, operated by B. F. Goodrich Rubber Co., Beaumont, has awarded contracts totaling $900,000 for remodeling and constructing its rubber plant to provide for the manufacture of cold process rubber and to include a refrigeration plant.

TEXAS CITY, TEX.—Petrol Refining Inc. has awarded a $400,000 contract to Rust Engineering Co., Clark Bldg., Pittsburgh, for design and construction of a crude oil topping plant.

TEXAS CITY, TEX.—Carbide & Carbon Chemical Corp., is spending $500,000 to expand its chemical plant.

VIRGINIA

RICHMOND, VA.—Hinde & Dauch Paper Co. has purchased land on Petersburg Pike for the construction of a new corrugated box factory; Carneal and Johnston, architects.

WASHINGTON

VANCOUVER, WASH.—Aluminum Co. of America has awarded a $1 million contract to L. H. Hoffman Co., 715 S. W. Columbia St., Portland, Oreg., for flume trap improvements at the aluminum plant.

CANADA

FLIN FLON, MAN.—Hudson Bay Mining & Smelting Co. Ltd., 500 Royal Bank Bldg., Winnipeg, will build a $5 million slag fuming plant.

ORILLIA, ONT.—Porcelain & Metal Products Ltd., W. A. Ralph, manager, plans to build a $100,000 manufacturing unit and storage addition.

VILLE LA SALLE, Montreal, Que.—Ross Engineering of Canada Ltd., St. Patrick St., has awarded a $400,000 contract to J. S. Hewson Ltd., 660 St. Catherine St. W., Montreal, for construction of a factory and office; E. I. Glance, 5975 Monkland Ave., engineer.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Continued from Page 129*)

packed 12.1c, ton lot 13.55c, less ton 15.2c Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.0c per lb of contained Si, carload packed 14.3c, ton lot 15.45c, less ton 16.7c Delivered. Spot, add 0.3c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Mn, 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. D., lump per lb c.l 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c, smaller lots 8.65c; or, lump, carload, bulk, 8.40c per lb of alloy, packed c.l. 9.20c, ton lots 9.30c, 200 to 1000 lb 9.65c, less 200 lb 10.15c per lb of alloy. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.00c per lb of briquet, c.l. packaged 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.0c per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 5.75c per lb of briquet, c.l. packed 6.55c, ton lot 7.35c, less ton 8.25c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 5.90c, c.l. packed 6.70c, ton lots 7.50c, less ton 8.40c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 80.00c per pound of Mo contained, fob Langeloth, Pa.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. Fob Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon (Ti 15-18%, C 6-8%). Contract, $160 per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21% C 3-4.5%). Contract, $175 per ton, fob Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5 max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 3.25-4% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, fob Bridgeville, Pa. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton a carload, 8c per lb, fob Suspension Bridge N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max. Si 8% max., C 0.5% max.). Contract, ton lot 2" x D, $2.75 per lb of contained Cb, less ton $2.80. Delivered. Spot, add 10c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%; Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload, packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.25c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 42-46%, Ca 5%, Ti 9%) C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50 fob Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%; V-7, Cr 28-32%, Si 15-21%, Mn 14-16%). C.l. packed, 14.25c per lb. of alloy; ton lots 15.75c; less ton lots 17.00c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, fob sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c. Effective Jan. 1, 1949, price will be $1.10, Langeloth.

Technical Molybdic-Oxide: Per lb, contained Mo, fob Langeloth, Pa., packed in bags containing 20 lb of molybdenum, 80.00c.